This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 437059

THE UNIVERSITY OF MICHIGAN · LIBRARIES ·
THE UNIVERSITY OF MICHIGAN
ARTES · SCIENTIA · VERITAS
1817

SB
107
.W36

GUIDE TO GARDEN PLANTS

A PRACTICAL

GUIDE TO GARDEN PLANTS

CONTAINING DESCRIPTIONS OF THE

HARDIEST AND MOST BEAUTIFUL ANNUALS AND BIENNIALS
HARDY HERBACEOUS AND BULBOUS PERENNIALS
HARDY WATER AND BOG PLANTS
FLOWERING AND ORNAMENTAL TREES AND SHRUBS
CONIFERS; HARDY FERNS; HARDY BAMBOOS
AND OTHER ORNAMENTAL GRASSES

ALSO THE BEST KINDS OF

FRUITS AND VEGETABLES

THAT MAY BE GROWN IN THE OPEN AIR IN THE BRITISH ISLANDS

WITH FULL AND PRACTICAL INSTRUCTIONS AS TO

CULTURE AND PROPAGATION

By JOHN WEATHERS, F.R.H.S.

LATE ASSISTANT-SECRETARY TO THE ROYAL HORTICULTURAL SOCIETY,
HORTICULTURAL LECTURER TO THE MIDDLESEX COUNTY COUNCIL,
FORMERLY OF THE ROYAL GARDENS, KEW, ETC.

'Then let the learnèd gardener mark with care
The kinds of stocks, and what those kinds will bear;
Explore the nature of each several tree,
And, known, improve with artful industry.
And let no spot of idle earth be found,
But cultivate the genius of the ground'—VIRGIL (*Dryden's translation*)

WITH 163 ILLUSTRATIONS

LONGMANS, GREEN, AND CO.
39 PATERNOSTER ROW, LONDON
NEW YORK AND BOMBAY
1901

All rights reserved

SB
107
.W36

PREFACE

IN adding a 'PRACTICAL GUIDE TO GARDEN PLANTS' to the literature of Gardening my chief aim has been to produce a book that will be unique and of real use not only to Amateur Gardeners, for whom it is particularly intended, but also to those engaged professionally in Horticulture. The work is the result of many years' experience among all kinds of Plants, gained in various nurseries and gardens in this country and on the Continent under many different conditions. It deals thoroughly with the description, cultivation, and propagation of all plants—Flowers, Fruits, and Vegetables—that may be grown more or less successfully in the open air in the British Islands, and it cannot be regarded in any sense as a botanical treatise or text-book. Tender plants which require the protection and artificial warmth of greenhouses have been excluded, with the exception of a few that may be grown in the open air during the summer months. Due regard has been given to the different climatic conditions prevailing throughout the British Islands, and the reader is advised as to whether any particular plant will flourish out of doors in all parts of the Kingdom, or only in a few favoured spots like Devonshire, Cornwall, and the South of Ireland.

ARRANGEMENT

The work has been divided into Four Parts for the sake of convenience. In Part I. the Life History of Plants from start to finish is dealt with in such a way, and without the use of technical expressions, so as to give the reader a good idea of the work carried on by the roots, stems, leaves, flowers, fruits &c. of plants in general.

The Propagation of Plants by means of Seeds, Cuttings, Budding, Grafting, Layering &c. is also discussed from a general point of view, so that the reader may be better able to grasp the details given later on under each particular genus and species. The various kinds of Soils, Manures, and Plant-foods have also received a good deal of notice, chiefly because the importance of such subjects is as a rule not fully grasped by amateurs. Intimately connected with Soils and Manures are the various operations for the improvement of the soil, such as Digging, Trenching, Hoeing, Raking, Mulching, Drainage &c., all of which are explained to the reader. The management of Lawns and Pathways is also dealt with in this portion of the work.

Part II. is devoted entirely to the Flower Garden, that is to say, to the Description, Culture, and Propagation of all the most beautiful HARDY ANNUALS and BIENNIALS; HARDY HERBACEOUS PERENNIALS; BULBOUS PLANTS; ROCK GARDEN PLANTS; HARDY WATER and BOG PLANTS; ORNAMENTAL and FLOWERING TREES and SHRUBS, including CONIFERS; HARDY BAMBOOS, and other ornamental GRASSES; besides HARDY FERNS, HORSETAILS, CLUBMOSSES &c.

This important part of the work includes almost everything worthy of a place in the garden. As many as 133 Natural Orders, containing over 1000 Genera and several thousand Species, have been described and fully dealt with in regard to Culture and Propagation in every case.

The plants have been arranged on a systematic basis, and that laid down by Bentham and Hooker in their standard work, the 'Genera Plantarum,' has been followed in the main. The natural orders, beginning with the Crowfoot Order (*Ranunculaceæ*), and ending with the Clubmosses (*Lycopodiaceæ*), follow each other according to their natural relationship, and the genera in each order are arranged in the same way. The species belonging to each genus, however, follow each other in alphabetical order for the sake of convenient reference.

The value of arranging all the flowering plants thus in their natural groups is fully discussed at p. 120 under the article on the 'Classification of Plants,' and need not be further referred to in this place, except to say that it is hoped the arrangement on such a basis will at once commend itself to every reader interested not only in growing plants, but also in studying them, and comparing their characteristics one with another. So that the reader may be able to see at a glance some of the choicest plants belonging to the various groups referred to above, a careful selection has been made from each of them. Thus there will be no difficulty in choosing any Annuals or Biennials, Hardy Herbaceous Perennials, Flowering Trees and Shrubs &c. one may wish to cultivate in his or her garden.

As colour plays a very important part in artistic gardening nowadays, lists are also given of Hardy Plants, having flowers of white, red, blue, yellow, purple, and other shades. These lists will be valuable for the purposes of massing in herbaceous borders to produce effect by means of contrast in floral colouring. As the height is given to almost every plant described it is scarcely necessary to make out a list of plants with various heights.

Under the 'Trees and Shrubs' at p. 107 the list has been so arranged as to enable the reader to see immediately which kinds are in blossom at any particular month of the year, from January to December.

Part III. is devoted to the Description, Culture, and Propagation of the best Hardy Fruits for our climate, and Part IV. is in the same way devoted to Vegetables. The Culture plays an important part in these two groups, and is fully described in simple language. The methods recommended are not those of any particular gardener, but such as are generally practised in the best gardens in the kingdom. Sometimes more than one way of growing a plant is mentioned, but the reader should always remember that while the principles of cultivation are usually the same, there may be many differences in detail. He should, therefore, use a wise discretion, by taking into consideration the nature of the soil, situation, aspect, altitude &c. of his own particular garden, and then by means of the information given, mixed with a little common sense (one of the best plant foods known), there will be little difficulty as a rule in growing his plants, flowers, fruits, or vegetables. As a reminder of the various operations to be performed during the year, a short calendar of work has been added to the Flower, Fruit, and Vegetable sections of the book.

THE GLOSSARY

Although it is always a difficult task for a technical writer to describe the objects and operations connected with his own profession in ordinary language, I have endeavoured to avoid as far as possible the use of all technical gardening and botanical expressions throughout the work, except where such were inevitable. Simple language has been used throughout, but technical words are to be found here and there in the descriptions of the various natural orders and genera. These terms, however, are comparatively few, and occur many times over under similar circumstances, so that the reader will soon regard them as ordinary language. With a view, however, of making their meanings quite clear, all technical expressions have been grouped together in a 'Glossary,' and numerous thumbnail sketches have also been given to further elucidate the meanings of many.

PLANT NAMES

One of the greatest complaints amateurs have against gardeners and botanists is that they *will* use 'such long Latin names' for their plants. And there are some even—very few it is to be hoped—who use this as an argument, not only against the study, but also the cultivation of beautiful plants. 'If you would only give your plants English names,' they say, 'we could understand them better and take more interest in them.' This may be very true, but such people seldom find difficulty with names like Begonia, Gloxinia, Campanula, Passiflora, Colchicum, Crocus, Primula, Geranium, Pelargonium, Zinnia, Phlox, Coreopsis, Nemophila, and many other botanical names which practice has rendered familiar. As a matter of fact it is simply impossible to give every plant an English name, and efforts to do so have resulted in some very peculiar if not really awkward and inappropriate appellations, which are often worse than the proper botanical name. There is no need to say anything against the use of proper English names for plants in all cases where they can be appropriately used and are generally accepted. Such English names are a help to the amateur, and throughout this work they have been used on every possible occasion, even to the extent of adopting popular names such as Buttercup, Poppy, Daisy &c. to represent the various natural orders to which they belong. No attempt, however, has been made to coin new or awkward popular names; and it must be pointed out that one and the same English name is often applied to two or more plants belonging to totally different families, as may be seen by reference to the copious INDEX at the end. The scientific names adopted throughout the work are those generally accepted by botanists throughout the world.

ILLUSTRATIONS

The illustration of species has not been attempted, as a satisfactory representation of each one would have necessarily increased the bulk of the book and its cost to the purchaser beyond what is thought desirable, and anything short of this would be of little practical value. As faithful a word-picture of a plant as possible has been given in the descriptions, and it is hoped that this will be of real practical value to the reader, and enable him to recognise any particular plant. Illustrations, however, have not been altogether abandoned. The 'Glossary of Technical Terms' at the beginning of the book has been freely illustrated, as have also such operations as Budding (p. 58), Grafting (p. 52), Layering (p. 59), Pruning (p. 1033), Tree-planting (p. 1032) &c. The differences between the branches bearing flower-buds and leaf-buds in most of the fruit trees have also been illustrated for the benefit of those amateurs who like to do their own pruning but are often not quite sure as to whether they are cutting away fruit-bearing branches or not.

Such, in brief, is an outline of the work; and I may add in conclusion that I am indebted for many hints and suggestions to numerous friends, among whom special mention may be made of Mr. JAMES BRITTEN, F.L.S., of the Botanical Department, British Museum; Mr. GEO. NICHOLSON, F.L.S.; Mr. W. WATSON, and Mr. W. J. BEAN, of the Royal Gardens, Kew; Mr. GEO. TEBBUTT, of Mogden Gardens, Isleworth; and Mr. W. H. DIVERS, Head Gardener to the Duke of Rutland, Belvoir Castle, who has kindly read the proofs of the Fruit and Vegetable portions of the work, and whose assistance may be regarded as an extra guarantee of accuracy and sound practical advice.

JOHN WEATHERS.

ISLEWORTH-ON-THAMES:
September 1900.

CONTENTS

PAGE
PREFACE v
GLOSSARY OF TERMS 1
INTRODUCTION 19

PART I

LIFE HISTORY OF CULTIVATED PLANTS:

The Seed 24
The Root 26
The Stem 29
The Leaves 32
The Flower 36
FERTILISATION AND HYBRIDISATION 37
THE FRUIT 38
INFLUENCE OF LIGHT ON VEGETATION 40
PROPAGATION OF PLANTS: 41
By Seeds 42
By Cuttings 48
By Grafting 52
By Budding 58
By Layering 59
By Dividing the Rootstock 60
By Suckers 60
THE SOIL, ITS NATURE AND COMPOSITION 61
IMPROVING THE SOIL 63
PLANT FOODS AND MANURES 69

PART II

THE HARDY FLOWER GARDEN 77
ANNUALS AND BIENNIALS 78
THE HARDY HERBACEOUS BORDER 80

PAGE
LIST OF CHOICE HERBACEOUS PERENNIALS 86
PLANTS FOR SHADY PLACES 88
TRAILING AND CLIMBING PLANTS 89
HARDY PLANTS WITH WHITE FLOWERS 90
„ „ „ RED FLOWERS 91
„ „ „ BLUE OR PURPLE FLOWERS 92
„ „ „ YELLOW FLOWERS 93
PLANTS IN FLOWER FROM SEPTEMBER TO MAY 94
BULBOUS AND RHIZOMATOUS PLANTS 95
THE ROCK GARDEN 96
ALPINE AND ROCK GARDEN PLANTS 102
ORNAMENTAL AND FLOWERING TREES AND SHRUBS 104
AUTUMN TINTS 110
EVERGREEN TREES AND SHRUBS 111
HARDY WATER AND BOG PLANTS 112
LAWNS 113
GARDEN WALKS AND PATHWAYS 117
CLASSIFICATION OF PLANTS 120
KEY TO NATURAL ORDERS OF PLANTS 121
DESCRIPTIONS, CULTURE, AND PROPAGATION OF ANNUALS, BIENNIALS, PERENNIALS, ORNAMENTAL TREES AND SHRUBS &c. 131–956
DESCRIPTIONS, CULTURE, AND PROPAGATION OF GRASSES, HARDY BAMBOOS AND SEDGES 956–972
DESCRIPTIONS, CULTURE, AND PROPAGATION OF CONIFERS . . 972–1008
DESCRIPTIONS, CULTURE, AND PROPAGATION OF HARDY FERNS, HORSETAILS, CLUBMOSSES 1008–1024
CALENDAR OF WORK FOR THE FLOWER GARDEN 1025–1027

PART III

THE HARDY FRUIT GARDEN 1028–1102

PART IV

THE VEGETABLE GARDEN 1103–1169

INDEX 1171

GLOSSARY

OF THE PRINCIPAL TECHNICAL TERMS USED SPARINGLY IN THIS WORK

Like every other profession, Gardening has its own peculiar terms and expressions, which are readily understood by the skilled practitioner. To the amateur, however, such technical terms and expressions are often bewildering when not explained in simple language or without illustration. To meet this difficulty, and to encourage the amateur to take a keener interest in the plants he may have in his garden, the technical terms used in this work are explained in the following glossary. In all cases where there is likely to be some doubt as to the meaning, an illustration has been given. It must, however, be understood that as regards form, it may often be necessary to use two or more terms to convey an accurate idea. Thus a leaf may be called 'ovate-lance-shaped' which means that its shape is somewhat between ovate and lance-shaped—it is broader than lanceolate (fig. 68) and narrower than ovate (fig. 75). And so on with other expressions. As a rule the mere botanical expressions have been avoided as far as possible in the body of the work, wherever a suitable English one could be substituted without inaccuracy.[1]

Abortive, Abortion, imperfectly formed or rudimentary, as is often the case of stamens and petals.

Acanthus, spiny.

Acaulescent, Acaulis, apparently stemless, as in Primroses and other plants where the spaces between the joints are very short.

Accrescent, growing after flowering is over, as with the calyx of *Physalis Francheti* (p. 691).

Accumbent, lying against a thing, applied to the seed leaves or cotyledons in the seed.

Acerosus, needle-shaped, as the leaves of Pines, &c. (see **Acicular**).

Achene, Achenium, a hard dry one-seeded superior fruit, as in Buttercup, Clematis, Strawberry. In fig. 1 the left hand drawing shows a magnified achene of a Buttercup with a section of the ovary, within which the seed *s* appears. The stigma is shown at *st*. The right-hand drawing shows a feathery achene of Clematis. The fruit is at *f*, and the awn at *a*.

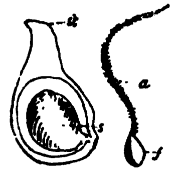

FIG. 1.—ACHENE.

Achlamydeous, flowers without sepals or petals, as with most of the plants described from p. 759 to p. 805.

Acicular, needle-shaped, as in the case of Pine leaves (fig. 2).

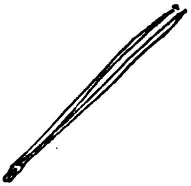
FIG. 2.—ACICULAR.

Acinaciform, scimitar-shaped, like leaves of some Mesembryanthemums.

Acrogenous, growing from the apex, as in the case of Ferns.

Aculeate, armed with prickles, as the stems of Roses, Brambles &c. (fig. 3).

Acuminate, drawn out into a long point; taper-pointed (fig. 4).

Acute, sharp; forming an angle less than a right angle at the tip.

Adelphia, a brotherhood. Stamens are monadelphous,' as in the Mallows (p. 270), 'diadelphous,' as in the Labiate family (p. 742), or 'polyadelphous,' as in the Hypericums (p. 265); according as they are arranged in one, two, or more fascicles or bundles.

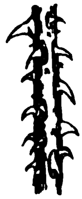

FIG. 3.—ACULEATUS.

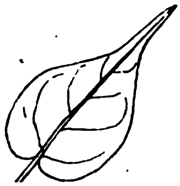

FIG. 4.—ACUMINATE.

Adnate, one organ united to another, as an ovary to the calyx-tube, or stamens to petals.

Adpressed, pressed close to anything, but not united with it, like the hairs on stems and leaves.

Adventitious, accidental, out of the usual place. Roots are said to be 'adventitious' when developed from any part of a plant except the 'radicle' or first downward growth from the seed.

Æruginous, verdigris coloured.

Æstivalis, produced in summer.

Æstivation, the arrangement of the parts of a flower (*i.e.* sepals, petals, stamens, pistils &c.) when in bud. The term 'præfloration' is used in America.

Agrestis, growing in fields.

Alabastrum, a flower-bud.

Alæ, the wings or side petals of a papilionaceous flower, represented in fig. 5 at *w*.

Alate, alatus, winged, as the stems of Thistles and various seeds—*e.g.* that of the Elm.

Albescens, albescent, turning white, or whitish.

Albumen, nutritious matter contained in the seed to feed the young plant until it has developed roots and leaves (see p. 25).

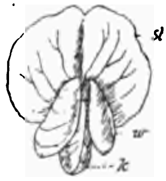

FIG. 5.—ALÆ.

Alburnum, the sap-wood, or outer rings of wood in dicotyledonous trees.

Albus, white.

Alliaceous, with a Garlic or Onion-like odour.

Alpestris, sub-alpine.

Alpine, a term applied to plants native of high mountains, beyond the forest range.

Alternate, leaves arranged on the stem one after another (fig. 6). Petals are alternate with the sepals, or the stamens with the petals, when they stand over the spaces between them.

Alveolate, honey-combed like; with hollows or depressions in regular order, as on the bare flower heads or receptacles of many of the Compositæ (p. 492).

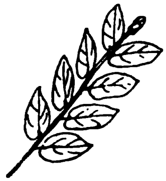

FIG. 6.—ALTERNATE.

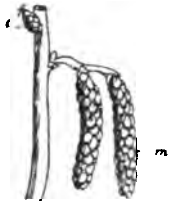

FIG. 7.—AMENTUM.

Amentaceous, a term applied to plants having the flowers in catkins, like the Willow and Hazel (fig. 7). A female flower is shown at *f*, and the male ones at *m*.

Amplexicaul, said of leaves when clasping the stem with the base (fig. 8).

Ampullaceous, swelling out like a bottle or bladder.

Anastomosing, forming a network, as the veins of leaves and fronds.

Ancipital, two-edged, as in the flower-stems of many Iridaceous plants.

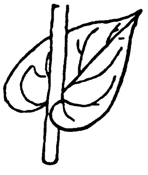

FIG. 8.—AMPLEXICAUL

Andrœcium, the male organs or stamens of a flower collectively (figs. 9, 55, 56, and 109).

Anemophilous, wind-loving—said of wind-fertilised flowers, like Willows, Conifers &c., the pollen of which is blown about by the wind and is thus carried to the stigmatic surface of the carpels in the female flowers.

Anfractuose, bent hither and thither.

Angios, covered, hidden. **Angiospermous,** having the seed enclosed in an ovary (p. 121).

Anisos, unequal. **Anisomerous,** parts unequal in number in the same flower.

Annual, flowering and fruiting the first season of being raised from seed, and of one year or season's duration only (p. 78).

Annulus, the name given to the ring of tissue around the upper portion of the stalk in Mushrooms and other Fungi. Also applied to the row of strong cells in spore cases of Ferns.

Anther, the essential part of the stamen which contains the pollen. In fig. 9 the anther is shown by the letter *a*.

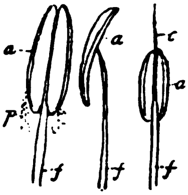

FIG. 9.—ANTHERS

Antheridium, the organ in Ferns corresponding to the stamens in flowers (p. 1009).

Apetalous, without petals, as with Anemones, Clematis &c.

Apex, the end furthest from the point of attachment, as in the case of leaves.

Aphyllous, leafless, like the stems of many exotic Euphorbias and Cactaceous plants.

Apiculate, having a very small hard point at the end or apex of a leaf, as in fig. 10.

Apocarpous, when several pistils or carpels in the same flower are separate, as in the Strawberry and many Ranunculaceæ.

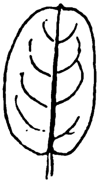

FIG. 10.—APICULATE.

Apterous, without wings.

Aquatic, aquatilis, living or growing in water.

Arachnoid, cobwebby, like some of the Houseleeks (p. 44).

Arboreus, arborescent, growing into a tree.

Archegonium, the organ in Ferns corresponding to the carpels or pistils in flowers (p. 1009).

Arcuate, curved like a bow.

Arenarius, arenose, growing in sandy soil.

Argenteus, silvery.

Argillose, argillaceous, growing in clayey soil.

Argos, Greek for silvery white—as in *argophyllus*, white-leaved.

Argutus, very sharply toothed.

Arillate, seeds furnished with an aril or fleshy growth from the base, as in the Yew, Euonymus &c. (fig. 11). At *a* is represented the fleshy aril, and at *f* the fruit or seed.

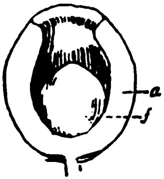

FIG. 11.—ARIL.

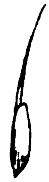

FIG. 12.—ARISTATE.

Aristate, awned or bearded, like Barley (fig. 12).

Articulatus, jointed.

Arvensis, growing in cultivated grounds.

Ascending, curving upwards into a vertical, from a more or less horizontal or prostrate position.

Asper, asperous, rough; furnished with harsh hairs.

Assimilation, the process of manufacturing food by the leaves (see p. 34).

Ater, deep black; used in combinations such as *atropurpureus*, *atrococcineus*, *atrosanguineus &c.*

Atratus, becoming black.

Attenuate, narrowing gradually to a point.

Aurantiacus, orange-coloured.

Auratus, golden-yellow.

Aureus, golden.

Auriculate, Auricled, having *auricles*, or ear-like appendages at the base of the leaves (fig. 13).

Awn, a long-pointed bristle-like appendage, as the beard of many kinds of grasses, like Barley, Oats &c.

Axil, the upper angle formed by the union of the stem and leaf.

Axile, proceeding from the centre or axis. This term is used in connection with the way seeds are arranged on the placentas in the ovary shown at *a* in fig. 86.

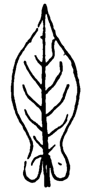

FIG. 13.—AURICULATE.

Axillary, produced in the axils of the leaves or other organs.

Axis, the main ascending stem and descending root of a plant.

Azureus, sky-blue.

Baccate, having a more or less succulent or pulpy seed-vessel or berry as in the Fuchsia, Aucuba, &c.

Barbatus, bearded, having tufts of soft hair.

Bearded, having long hair like a beard, as the 'crests' of many Irises (p. 917).

Berry, a pulpy fruit containing several seeds imbedded in the juice, as the Currant, Gooseberry, Orange &c. (fig. 14).

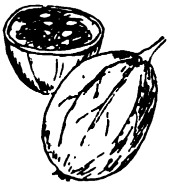

FIG. 14.—BERRY.

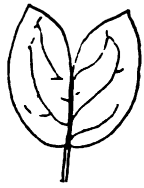

FIG. 15.—BIFID.

Bifid, divided half-way down into two parts (fig. 15).

Bijugate, having only two pairs of leaflets, as shown in fig. 16.

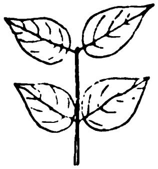

FIG. 16.—BIJUGATE.

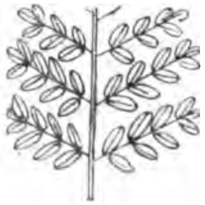

FIG. 17.—BIPINNATE.

Bipartite, divided nearly to its base into two parts; nearly the same as **Bifid.**

Bipinnate, when the pinnæ or divisions of a pinnate leaf are themselves again pinnate, as shown in fig. 17.

Bipinnatifid, when the divisions of a pinnatifid leaf are themselves pinnatifid (fig. 18).

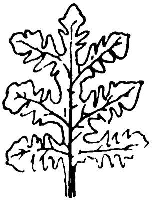

FIG. 18.—BIPINNATIFID.

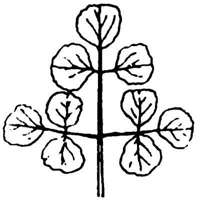

FIG. 19.—BITERNATE.

Biternate, when the divisions of a ternate leaf are themselves ternate (fig. 19).

Blade, the lamina or flat part of a leaf (fig. 98, *b*).

Bracteatus, furnished with bracts.

Bracteoles, minute bracts attached to the base of the pedicels.

Bracts, small leaves somewhat different from the others, seated on the flower stalks (peduncles) (fig. 89, *b*).

Bulb, a leaf-bud with fleshy scales, usually placed underground. In fig. 20 *a* represents the scaly bulb of a Lily, and *b* the tunicated bulb of a Tulip.

Bulbiferous, bearing bulbs.

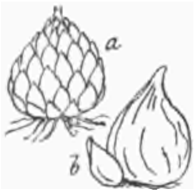

FIG. 20.—BULBS.

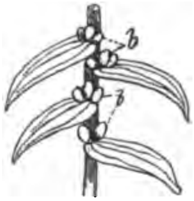

FIG. 21.—BULBILS.

Bulbils, small bulbs, produced in the axils of the leaves of many Lilies (fig. 21, *b*).

Bulbous, having bulb-like stems or roots.

Bullate, blistered or puffed up, like the leaves of Savoys.

Caducous, dropping off, as the petals of Poppies.

Cæruleus, pale blue.

Cæsius, ash-grey.

Cæspitose, in close dwarf tufts, like many Dianthus (p. 238).

Calcarate, furnished with a spur, like the flowers of Larkspurs, Columbines, Tropæolums &c. (fig. 22).

Calceolate or **Calciform,** having a pouch or slipper, as in Calceolaria and the Lady's Slipper Orchid (fig. 23).

Calyx (Sepals), the outer and usually greenish whorl of leaf-like organs of the flower below the corolla (petals). The calyx is shown at *c*, and the petals at *p*, in fig. 22.

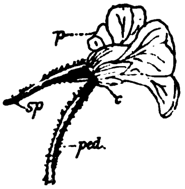

FIG. 22.—CALCARATE.

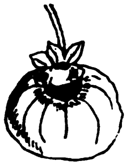

FIG. 23.—CALCEOLATE.

Cambium-layer, see p. 30.

Campanulate, bell-shaped, as in the Campanulas, p. 562 (fig. 24).

Campestris, growing in fields.

Candidus, pure white.

Canescens, greyish-white.

Capillary, like very slender threads.

Capitate, Capitular, Capitulum, growing in heads or close clusters, as with most flowers of the Composite order (fig. 25).

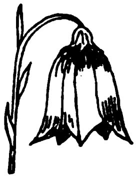

FIG. 24.—CAMPANULATE.

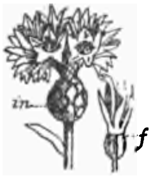

FIG. 25.—CAPITULUM.

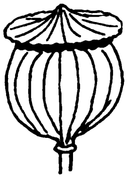

FIG. 26.—CAPSULE.

Capsule, a dry usually many-seeded seed-vessel, as in Poppy (fig. 26).

Carcerule, the name applied to the fruits of many of the Mallow and Hollyhock tribe (fig. 27).

Carneus, flesh-colour.

Carpel, the free or united divisions of the ovary or capsule.

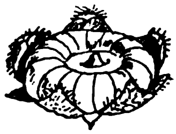

FIG. 27.—CARCERULE.

Cartilaginous, tough and hard, often applied to the margins of leaves.

Caruncle, an outgrowth or excrescence at the scar (hilum) of some seeds, such as the Castor Oil plant (Ricinus) and the Viola (fig. 28).

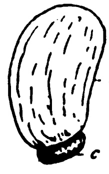

FIG. 28.—CARUNCLE.

Catkin, a spike of closely crowded flowers of one sex, in which the perianths are replaced by bracts, as in Alders, Birches, Hazels, Willows (fig. 7).

Caulicle, a little stem; the name sometimes given to the rudimentary stem in dicotyledonous seedlings.

Cauline, belonging to or produced from the stem.

Cell, see p. 22.

Centrifugal, applied to those forms of inflorescence whose terminal or central flowers open first.

Centripetal, flowering from the base or circumference towards the centre or tip, as in Wallflowers.

Cernuus, drooping, pendant.

Chaffy, covered with minute membranous scales.

Channelled, hollowed somewhat like a gutter on the upper surface of leaves or down the stem.

Chlorophyll, see p. 33.

Chryso, in compounds, signifies golden-yellow, as *Chrysanthus*.

Cilia, Ciliate, hairs placed like eyelashes on the edge of leaves, petals &c. (fig. 111).

Circinate, rolled up from the top towards the base like a crosier, as with the unfolding fronds of Ferns (fig. 29).

Circumscissile, divided by a circular slit or opening round the sides, as shown in fig. 90.

Cladodes, leaf-like branches, as in Butcher's Broom, p. 810.

Clavate, club-shaped, a body which is slender at the base and gradually thickening upwards.

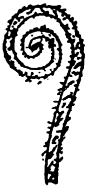

FIG. 29.—CIRCINATE.

Claw, the narrow and suddenly contracted base of a petal (fig. 30). *c* represents the claw proper, *b* the blade, and *s* the scales often seen in many flowers of the Pink order (p. 238).

Cleft, deeply cut, but not to the midrib.

Coccineus, scarlet or carmine tinged with yellow.

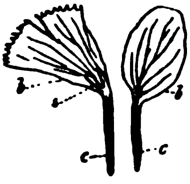

FIG. 30.—CLAW.

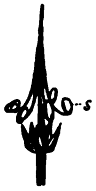

FIG. 31.—COCCI.

Coccus, Cocci, the separable carpels or nutlets of a dry fruit, as in Pelargoniums and Geraniums (fig. 31, shown at *s*).

Cohering, the attachment of similar parts, as the petals forming a gamo- or monopetalous corolla; and when the filaments of stamens are united.

Column, a term more particularly used to denote the united stamens and pistils in the Orchid family (p. 890). In fig. 32 *st* represents the stigmatic surface in a hollow on to which the pollinia (one of which is shown at *p*) must be placed to produce seeds. At *a* is shown the covering or lid over the pollinia.

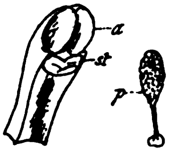

FIG. 32.—COLUMN.

Comose, furnished with hairs at the end, as some seeds like those of the Composite order.

Compound, formed of many similar parts, as the leaves of Thalictrums, Aquilegias, Horse Chestnut, Acacia &c.

Compressed, flattened laterally.

Conical, narrowing to a point from a broad circular base.

Connate, when two similar parts are slightly connected round the stem, as the leaves of some Loniceras (fig. 33).

Connective, the rib or part of the filament between the anther-cells, often produced, as in *Paris quadrifolia* (fig. 9, *c*).

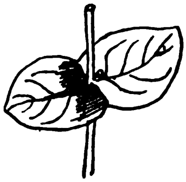

FIG. 33.—CONNATE.

Contorted, in æstivation, when one edge of a petal or sepal is covered and the other free or exposed; twisted.

Convolute, in æstivation or vernation, when one part is rolled up within another lengthwise.

Cordate, with two rounded lobes at the base, heart-shaped (fig. 34).

Coriaceous, leathery, tough.

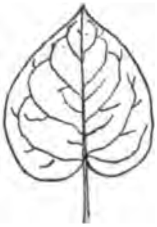

FIG. 34.—CORDATE.

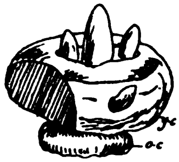

FIG. 35.—CORM.

Corm, a fleshy bulb-like, solid, not scaly, underground stem, as in Crocus, Gladiolus, Cyclamen. See fig. 35, which represents the corm of a Crocus, the young one (*yc*) being above the old one (*oc*).

Corolla, the whorl of floral leaves, called petals, between the calyx and stamens, usually coloured. Figs. 5, 22, 23, 36, 40, 49, 58 &c. show many kinds of corollas.

Corona, a term applied to the crown or trumpet in the centre of most Narcissus and Daffodil flowers (fig. 36, *c*).

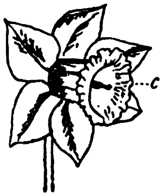

FIG. 36.—CORONA.

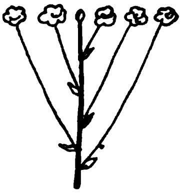

FIG. 37.—CORYMB.

Corymb, a raceme with the pedicels becoming gradually shorter as they approach the top of the flower stalk, so that all the flowers are nearly on a level (fig. 37).

Corymbose, in the form of a corymb.

Costate, ribbed.

Cotyledons, the seed lobes, often forming the first leaves of the plant (fig. 48, *c*).

Crassus, thick and fleshy.

Cremocarp, the name given to the half-fruits or carpels of the Umbellifer family, which split apart when ripe (fig. 38).

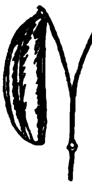

FIG. 38.—CREMOCARP.

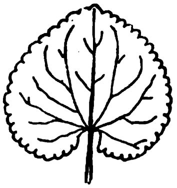

FIG. 39.—CRENATE.

Crenate, with rounded teeth on the margins of leaves. See fig. 39, which represents a heart-shaped (cordate) reniform (kidney-shaped) leaf with a crenate margin.

Crenulate, minutely crenate.

Crested, having an appendage like a crest, as in the cultivated forms of many Ferns and in Cockscombs (p. 762).

Crinitus, furnished with tufts of shaggy hair.

Cruciform, four parts, as petals, arranged so as to form a cross, as in Arabis, Wallflower, and most of the Crucifer order (fig. 40).

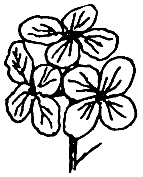

FIG. 40.—CRUCIFORM.

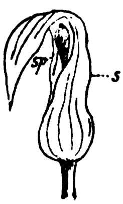

FIG. 41.—CUCULLATE.

Cryptogamous, see p. 121.

Cucullate, hooded, as the spathe of *Arum italicum* (fig. 41). See **Spathe**.

Cuneate, like a wedge, but attached by its point, usually applied to the shape of leaves or petals.

Cuspidate, abrupt, but with a little point at the end; something like apiculate but larger (fig. 42).

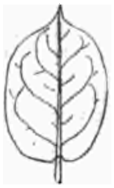

FIG. 42.—CUSPIDATE.

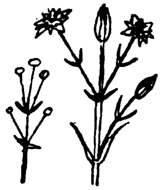

FIG. 43.—CYME.

Cyme, inflorescence formed of a terminal flower, beneath which are side branches each having a terminal flower and branches again similarly dividing, and so on, as in many plants of the Pink Order (fig. 43).

Cymose, arranged in a cyme.

Dealbatus, covered with a greyish-white powder.

Deca, in compounds signifies *ten*—as *decapetalus*, ten-petalled.

Deciduous, falling off, said of the leaves of large numbers of trees and shrubs in autumn; **Caducous** has the same meaning but is applied to the sepals and petals of most flowers after expansion.

Declinate, bent downwards, like the stamens in many flowers.

Declining, straight, but pointed downwards.

Decompound, subdivided more than three times, as the leaves of many Umbelliferous plants, Thalictrums &c.

Decumbent, said of stems lying on the ground, but tending to rise at the tips.

Decurrent, when the limb of a leaf is prolonged down the stem, below the point of attachment of the midrib, as in the case of the common Comfrey, many Thistles &c. (fig. 44).

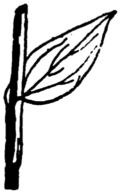

FIG. 44.—DECURRENT.

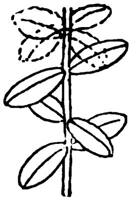

FIG. 45.—DECUSSATE.

Decussate, opposite leaves in four equal rows, as in many Veronicas (fig. 45).

Deflexed, curved downwards or towards the back.

Dehiscence, the mode in which an ovary or fruit opens to shed its seeds. Fig. 46 shows various ways in which the pods open; *a* is called *loculicidal*, and *b* *septifragal* dehiscence.

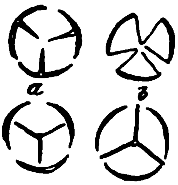

FIG. 46.—DEHISCENCE.

Deltoid, fleshy with a triangular transverse section.

Dentate, with short triangular teeth, as on the margins of many leaves.

Denticulate, finely toothed, like the Camellia leaf.

Depressed, when flattened at the top, like many Apples, Onions.

Di, in compounds, signifies *two*, as *diandrous*, 2 stamens.

Diadelphous, stamens in two bundles or fascicles, as in some Leguminous flowers (fig. 47).

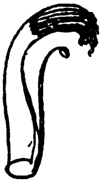

FIG. 47.—DIADELPHOUS.

Dichlamydeous, having both calyx and corolla, as in most of the flowers described between p. 131 and p. 759.

Dichotomous, when a branch, stem, or flower-stalk is much forked in pairs.

Diclinous, the same as Unisexual, when stamens and pistils are in different flowers.

Dicotyledonous, said of plants having two seed-leaves, and afterwards net-veined leaves &c., as explained at p. 122. Fig. 48 shows a seedling dicotyledon: *r* shows the true roots; *h* the hypocotyl or part between the true root and true stem; *c* the cotyledons or seed-leaves; *a*, the first pair of true net-veined leaves, and *p* the first true bud after the original one called a *plumule*.

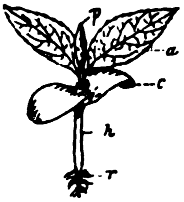

FIG. 48.—DICOTYLEDON.

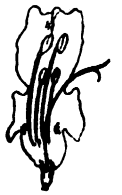

FIG. 49.—DIDYNAMOUS.

Didynamous, having four stamens, two shorter than the others, as in many plants of the Labiate order (fig. 49).

Digitate, fingered leaves or lobes all starting from the top of the petiole, as the leaves of the Lupin, Horse Chestnut &c. (fig. 50).

Dimidiate, the two halves of an organ very unequal in size, like the leaves of Begonias, Lime trees &c. (fig. 51).

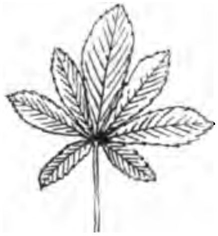

FIG. 50.—DIGITATE.

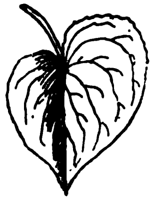

FIG. 51.—DIMIDIATE.

Diœcious, with the different sexes on different plants: stamens on one plant, pistils on another, as in Willows, Aucubas, Hippophaë &c.

Disc, a fleshy surface from which the stamens and pistils spring. The term 'disciforæ' has been applied to a large class of plants having these characters (p. 123). Disc florets are the central flowers in Composite plants like Daisy, Marguerite &c.

Dissected, deeply divided into many narrow lobes, like the leaves of Umbelliferous plants, Thalictrums &c.

Dissepiments, the partitions of an ovary or fruit, as shown in fig. 46.

Distichous, arranged in two opposite rows, as the leaves of *Taxodium distichum* (p. 983).

Divaricate, spreading at an obtuse angle.

Drupe, a fleshy fruit having a hard stone (putamen or endocarp, shown at *s*), as the Cherry, Plum, Peach &c. (fig. 52). *m* represents the fleshy edible portion called *mesocarp*, and *e* the skin or *epicarp*. See **Pome,** fig. 88.

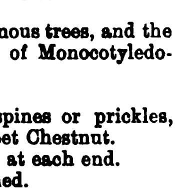

FIG. 52.—DRUPE.

Duramen, the heartwood or centre of Dicotyledonous trees, and the outer part of the stem of Monocotyledonous.

Echinate, clothed with spines or prickles, like the fruit of the Sweet Chestnut.

Elliptic, oval, but pointed at each end.

Elongate, much lengthened.

Emarginate, slightly notched at the end, as in the case of many leaves (fig. 53).

Embryo, the germ of a plant in the seed (see p. 24).

Ensiform, sword-shaped, as the leaves of Iris, Gladiolus &c.

Entire, said of leaves, petals, sepals not toothed nor lobed, nor divided at the edge.

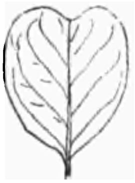

FIG. 53.—EMARGINATE.

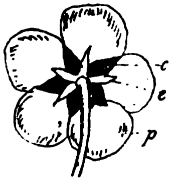

FIG. 54.—EPICALYX.

Epicalyx, the term applied to the secondary calyx or sepals, as seen in Strawberries and Mallows. In fig. 54, *e* shows the epicalyx; *c*, the calyx (or sepals) proper; and *p* the petals.

Epidermis, the skin of a leaf or stem immediately underlying the cuticle.

Epigynous, when the parts of a flower are apparently seated on the ovary (fig. 55).

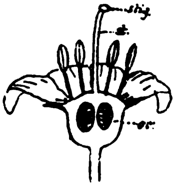

FIG. 55.—EPIGYNOUS.

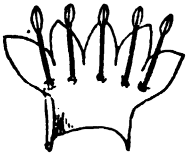

FIG. 56.—EPIPETALOUS.

Epipetalous, when the stamens are seated on the petals or corolla, as in Primroses &c. (fig. 56).

Equitant, overlapping each other, as the leaves of the Iris.

Erose, irregularly cut, as if gnawed, somewhat as represented in fig. 95.

Etærio, a fruit composed of several drupels, as in the Blackberry.

Exogenous, growing by additions to the circumference. This term was formerly used instead of Dicotyledonous.

Exserted, projecting beyond, as stamens protruding beyond the corolla or petals, as in figs. 55 and 56.

Exstipulate, without stipules.

Extrorse, applied to anthers which shed the pollen outwards, or away from the pistil.

Falcate, sickle-shaped, applied to leaves like some of the Eucalyptuses.

Fasciated, a term applied to stems which become abnormally flattened, and bear an extraordinary number of flowers or leaves, as is often seen in Asparagus and in *Lilium auratum*.

Fascicle, a cyme or crowded cluster of flowers placed on short pedicels of nearly equal length, as in Sweet William and other Pinks.

Fasciculate, when several similar parts are collected into a bundle and spring from the same spot.

Fastigiate, applied to the branches of a tree when they are erect and close, like a tapering birch broom, as in the upright Cypress and Lombardy Poplar.

Fimbriate, fringed at the margin, like the petals of Carnations, Sweet Williams, and other Pinks, as shown in fig. 30.

Fistular, applied to the hollow stems and leaves of plants, as in many of the Umbelliferæ.

Flaccid, weak, flabby, as when leaves droop for want of water.

Flavus, flavidus, pale yellow.

Flexuose, zigzag, usually changing its direction at each joint, like the branches of many trees, the Beech &c.

Floccose, with little tufts like wool.

Florets, the small flowers of Composite plants (fig. 25, *f*).

Fluitans, floating.

Fluviatilis, aquatic.

Follicle, an inflated 1-celled carpel, opening by a suture to which several seeds are attached, as in Trollius, Delphinium, Pæonia (fig. 57).

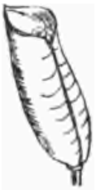

FIG. 57.—FOLLICLE.

Free, separate, not joined together or with any other organ.

Frond, the leaf-like part of Ferns, whether simple or divided.

Fruit, the seed-vessel or ovary with its ripe contents (seeds) and any external appendages.

Frutex, Frutescent, Fruticose, a shrub, shrubby; a woody plant destitute of a trunk, and branching from the base, or nearly so.

Fugacious, soon falling off, like the cap on the flower-bud of Eschscholtzia, the sepals and petals of Poppies &c.

Fulvus, dull yellow, buff.

Funnel-shaped, tubular below, but gradually enlarging upwards, like the flowers of some Convolvuluses (fig. 66).

Furcate, forked.

Fuscus, brownish.

Fusiform, spindle-shaped, thick tapering to each end, like the root of a long Radish.

Galbalus, the fleshy and ultimately woody cone of Junipers and Cypresses.

Galeate, shaped like a helmet, as the upper segment of the flower of Monkshood (fig. 58).

Gamopetalous, when the petals are united together, as in Canterbury Bells, Laurestinus, Forsythias, and most of the plants described under Gamopetalæ in this work, p. 477, see figs. 59, 60, 63, 66, 67.

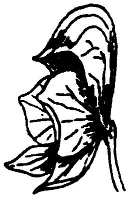

FIG. 58.—GALEATE.

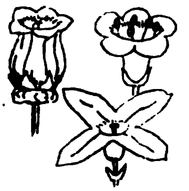

FIG. 59.—GAMOPETALOUS.

Gibbous, swollen on one side, like the flower of Valerian (fig. 60).

Glabrous, without hairs or down on the surface, as the leaves of Camellias, Aucubas, Cherry Laurels &c.

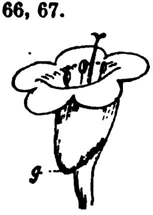

FIG. 60.—GIBBOUS.

Gland, Glandular, a wart-like cellular secreting organ usually raised above the surface, as on the leaves of many Peaches.

Glandular-hairy, having hairs tipped with glands.

Glans, a name applied to the fruit of the Oak. In fig. 61, *c* represents the cupule, without the seed, and *g* the entire fruit.

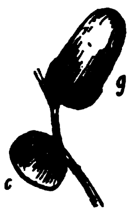

FIG. 61.—GLANS.

Glaucous, sea-green with a whitish-blue lustre, like the thick fleshy leaves of *Echeveria secunda*, and many Aquilegias &c.

Globose, round like a globe, used in connection with inflorescences, like the heads of flowers of *Echinops Ritro*, as well as of single bodies like fruits, capsules &c.

Glumes, the scales enclosing the spikelet of flowers in Grasses.

Graveolens, possessing an intense odour, as in *Ruta graveolens*, the Rue.

Gymnos, in compounds signifies *naked*, as 'Gymnospermous,' naked-seeded, applied to the Coniferæ (p. 972).

Gynandrous, stamens and styles consolidated, as in the case of the Orchid family (p. 890), shown under **Column** (fig. 32).

Gynœcium, the female organs, that is, carpels or pistils collectively.

Habit, the port or aspect of a plant.

Hastate, a leaf enlarged at the base into two lobes pointing outwards nearly horizontally (fig. 62

Head, a close terminal collection of flowers surrounded by an involucre, as in composite flowers; the same as a capitulum.

Herbaceous, the parts of plants which are not woody; also organs, or parts of them, of a green colour.

Hermaphrodite, flowers having both stamens and pistil, as in figs. 49, 55, 60 &c.

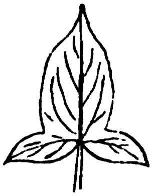

FIG. 62.—HASTATE.

Hesperidium, a hard-rinded berry, like the Orange and Lemon.

Hirsute, with long soft hairs.

Hispid, covered with stiff hairs.

Hoary, with greyish-white down.

Hooded, flowers formed into a hood at the end, like the Aconites. *See* **Galeate** (fig. 58).

Humilis, dwarf, low.

Hybrid, *see* p. 37.

Hypo, in compounds, signifies *under*, as hypogynous stamens, below the pistil, as shown in fig. 109.

Hypocotyl, the part of the young stem below the seed leaves, as shown at *h*, fig. 48.

Hypocrateriform, salver-shaped, said of flat corollas (fig. 63). At *t* is shown the 'tube' of such flowers.

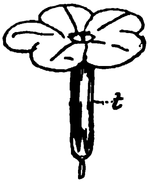

FIG. 63.—HYPOCRATERIFORM.

Igneus, bright scarlet.

Imberbis, destitute of hairs.

Imbricate, arranged over each other like the scales of flower and leaf buds.

Impari-pinnate, pinnate, with an odd terminal leaflet, as shown in fig. 63, in which *l* indicates one of the 5 leaflets composing the whole leaf, *p* the stalk or petiole, and *st* the stipules. This is the same as *oddly-pinnate*.

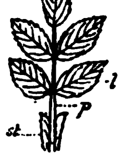

FIG. 64.—IMPARI-PINNATE.

Incised, deeply cut, as the leaves of the Hawthorns.

Included, not extending beyond the organs surrounding it; said of stamens which do not project beyond the mouth of the corolla.

Incomplete, some part wanting, as calyx, corolla &c. Plants belonging to the Incompletæ section are described from p. 759 to p. 805.

Incurved, curved inwards.

Indefinite, many, but uncertain in number, said of stamens when more than 20 in number, as in Buttercups, Wild Roses &c.

Indehiscent, not bursting, said of fruits which do not open spontaneously when fully ripe.

Induplicate, when the edges of organs arranged in a valvate manner are folded inwards.

Indusium, the membranous covering of the spores-cases of many Ferns, as shown in fig. 65; *in* represents the indusium, and *sp* the spore-cases. A solitary spore-case burst and scattering spores is shown in fig. 105.

Inferior, applied to an ovary when the calyx tube is adnate to it; and to the calyx when it is quite free from the ovary and below it, in which latter case the *ovary* is superior.

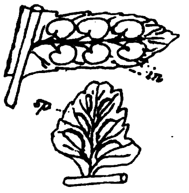

FIG. 65.—INDUSIUM.

Inflexed, curved inwards.

Inflorescence, the arrangement of the flowers upon the stalk or peduncle. Inflorescences are spoken of as *racemose*, *cymose*, *spicate*, *capitate*, *corymbose*, *paniculate* &c., according as to whether they are borne in the manner described by those terms.

Infundibuliform, funnel-shaped (fig. 66).

Internode, the space between two nodes or joints of a stem.

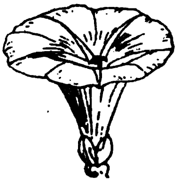
FIG. 66.—INFUNDIBULIFORM.

Interruptedly pinnate, when pairs of small pinnæ alternate with large ones.

Introrse, said of anthers which open inwards towards the pistil or carpels.

Involucels, the involucres of secondary umbels.

Involucre, the whorled bracts at the base of an umbel, head, or single flower, as in figs. 25, and 113, *in*.

Involute, rolled from the back of anything, as towards the upper side of a leaf.

Irregular, petals or sepals unequal in size, or different in form in the same flower, as shown in figs. 5, 22, 23, 49.

Jugum, applied to a pair of leaflets; thus a leaf may be *unijugate*, *bijugate*, or *multijugate* according as there are one, two, or many pairs of leaflets (figs. 16, 17).

Keel, the name given to the lower pair of petals of Papilionaceous or Pea-like flowers. In fig. 5 the keel is shown at *k*.

Labellum, the same as 'lip,' q.v.

Labiate, lipped, as the flowers of many plants of the Labiatæ family; a corolla or calyx divided into 2 unequal portions (fig. 67).

Laciniate, divided into narrow irregular lobes.

Lacteus, white, with a faint tinge of blue.

Lacustris, growing in lakes.

Lamina, the blade of a leaf, as shown at *b* in fig. 98.

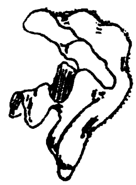
FIG. 67.—LABIATE.

Lanceolate or **lance-shaped,** narrowly elliptic, and tapering to each end, as shown in fig. 68, in which *a* represents a lance-shaped leaf proper, and *b* an oblanceolate leaf, or a lance-shaped leaf reversed.

Lancet-shaped, shortly and bluntly lanceolate.

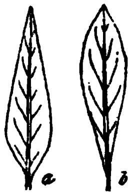

FIG. 68.—LANCEOLATE.

Lax, loosely arranged, often used in connection with the arrangement of flowers on the stems.

Leaflets, the subdivisions of compound leaves, as shown in figs. 16, 17, 50, 64.

Legume, a 1-celled and 2-valved seed vessel with the seeds arranged along the inner angle, as in the Pea, Bean &c. (fig. 69).

Ligulate, strap-shaped, used in connection with the shape of leaves, and also of the 'ray' or outer spreading florets in plants of the Composite order (p. 492).

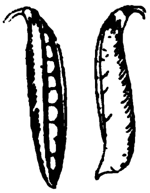
FIG. 69.—LEGUME.

Ligule, a membrane at the base of the blade of the leaf of Grasses.

Limb, the flattened expanded part of a leaf or petal, as shown at figs. 70, 72, 73 &c.

Linear, very narrow and long.

Lingulate, tongue-shaped, long, fleshy, convex, blunt.

Lip, this term (and also the Latin equivalent *labellum*) is used particularly to designate the largest and most conspicuous segment of an Orchid flower, as shown in fig. 70. Here *l* is the lip, *col* the column, more highly shown at fig. 32, *p* the petals, *s* the sepals, and *us* the upper sepal.

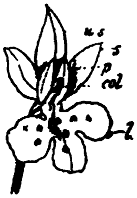

FIG. 70.—LIP.

Littoralis, growing on the sea-shore.

Lobate, cut into rather large divisions, as with many leaves.

Lobule, a small lobe.

Loculicidal (dehiscence), splitting down the back between the divisions, as shown in fig. 46, *a*.

Lucidus, shining.

Lunate, shaped somewhat like the new moon, but not so regular in outline.

Luteus, yellow.

Lyrate, a pinnatifid leaf with the lobes successively and gradually enlarging upwards from the petiole, and ending in one larger than the others (fig. 71).

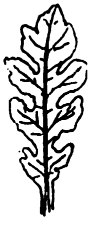

FIG. 71.—LYRATE.

Macros, in composition, long, large, as *macrophylla*, large-leaved.

Marcescent, withering, but remaining in its place, like the calyx and corolla of many flowers.

Medulla, botanical name for pith. The **medullary rays** (*see* p. 30) are the 'silver grain' of the wood of Dicotyledons.

Membranous, of the texture of membrane; thin and flexible; more or less papery.

Micropyle, the orifice in the ovule (*see* p. 24).

Midrib, the large vein extending along the middle of a leaf from its petiole nearly or quite to the other end, as shown in the leaves in figs. 4, 34, 72 &c.

Mono, in compounds signifies *one*, as *monocotyledon*, one seed-leaf.

Monocarpic, flowering and fruiting only once, like some of the American Aloes (Agave) (see p. 21).

Monochlamydeous, the term given to flowers which have only one set of floral envelopes—either petals or sepals (*see* p. 126).

Monocotyledonous, having one sheathing cotyledon or seed-leaf, as in the Oat, Wheat, Barley, Onion, Lily, and most of the plants belonging to the Monocotyledonous group, described between p. 805 and p. 972.

Monœcious, with the stamens and pistils in separate flowers but on the same plant, as in Cucumbers, Marrows, Begonias, and Filberts. At fig. 7, *f* represents the female flowers, and *m* the male flowers of the Filbert on the same branch.

Monosepalous, monopetalous, when the sepals or petals are joined by their edges so as apparently to form one, the same as **gamosepalous** and **gamopetalous** (fig. 59).

Mucronate, abruptly tipped with a short point of the same texture.

Multi, in compounds signifies ***many***, as ***multiflorus*** many-flowered, ***multicolor***, many-coloured.

Multifid, divided into many parts.

Muricate, covered with sharp short points.

Mutabilis, changeable.

Mycelium, the 'spawn' of Fungi (*see* 'Mushrooms,' p. 1167).

Nectary, an organ which secretes honey. Nectaries are found at the base of the petals in Buttercups; in the Hellebores (p. 152) &c. the petals are reduced to nectaries, and in the Parnassia (p. 428) there is a radiating fringe of nectaries at the base of each petal.

Netted, covered with veins or nerves connected together like network, as shown in figs. 34, 39, 98, 101 &c.

Niger, black.

Nitidus, smooth and shining.

Nivalis, from snowy regions.

Niveus, snowy-white.

Node, a point in a stem where a leaf is produced.

Nucleus, the name given to the central and denser mass in the protoplasm (*see* p. 22).

Nudus, naked.

Nut, a hard dry 1-seeded seed-vessel.

Nutans, drooping, nodding.

Ob, in conjunction with terms means inverted; thus *obcordate* (fig. 72) means a heart-shaped leaf attached to the stalk by the narrow end; *obovate* (fig. 73) means ovate with the attachment at the narrow end, and the same with *oblanceolate* (fig. 68, *b*).

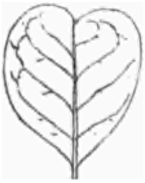

FIG. 72.—OBCORDATE.

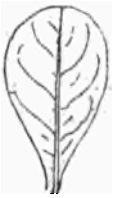

FIG. 73.—OBOVATE.

Oblong, long oval, equally broad at each end.

Obtuse, rounded or blunt.

Ocrea, a tubular membranous stipule surrounding the stem, as in many of the Polygonums (fig. 74).

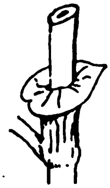

FIG. 74.—OCREA.

Odes, Oides, a termination denoting similarity, resemblance.

Opposite, when two similar organs, as leaves, for example, grow one on each side of some body; or different organs are opposed to each other with a stem between them.

Orbicular, nearly round and flat, as in fig. 79, which shows an orbicular and peltate leaf of *Tropæolum majus*.

Oval, an ellipse; not broader at one end than at the other, and about twice as long as broad.

Ovary, the immature seed-vessel.

Ovate, egg-shaped; a short flat figure rather broader below the middle of its length (fig. 75).

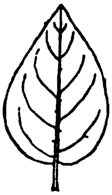

FIG. 75.—OVATE.

Ovoid, the same as *ovate*, but applied usually to solid, and not flat, bodies, *e.g.* Apples, Pears, Plums.

Ovule, the name applied to the young seed before it has been fertilised by the contents of the pollen-tube.

Palate, the prominent part of the base of the lower lip which closes the mouth of a personate corolla, as shown in the flower of Snapdragon at fig. 84, *p*.

Palea, the leaf-like parts of the flower of Grasses, inclosing the stamens, pistils, and hypogynous scales.

Paleaceous, furnished with chaffy scales, as the receptacle of some Composites.

Palmate, spreading like the fingers of a hand from the same point.

Palmate-lobed, palmate with lobes, as in the leaves of the Maple.

Palmatifid, palmate, with the lobes extending to the middle of the leaf, as in the Castor Oil plant (fig. 76).

Palmatisect, palmate, with the divisions extending to the bottom of the leaf.

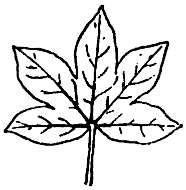

FIG. 76.—PALMATIFID.

Paludosus, Palustris, growing in marshy places.

Panicle, a raceme with branching pedicels (fig. 77).

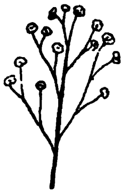

FIG. 77.—PANICLE.

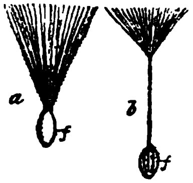

FIG. 78.—PAPPUS.

Papilionaceous, like the flower of a Pea (fig. 5).

Pappus, the crest of the fruit in Composites, formed of the altered limb of the calyx. In fig. 78, *a* shows a sessile or stalkless pappus, and *b* a stalked or stipitate pappus; *f* is the fruit.

Parasitic, living on another plant, like the Mistletoe (p. 781).

Parenchyma, the soft cellular tissue of plants, the green pulpy material between the ribs and veins of leaves.

Parietal (placentation), on the sides or walls of the carpels, as shown in fig. 86, *p*.

Paripinnate, pinnate with an equal number of leaflets, as shown in fig. 85.

Patent, spreading widely, a term often used by botanists in connection with the petals of a corolla.

Pectinate, scalloped, crenately incised, like the teeth of a comb.

Pedate, palmate with three lobes and the lateral lobes having similar large lobes on their outer edge, as the leaves of *Helleborus*.

Pedate-lobed, pedate, with rounded divisions or lobes.

Pedatifid, pedate, with the divisions reaching to the middle of the leaf.

Pedatipartite, pedate, with the divisions nearly reaching to the bottom of the leaf.

Pedatisect, pedate, with the divisions extending nearly to the midrib.

Pedicel, the branch of a peduncle, otherwise the stalklet of an individual blossom, as shown in fig. 91, *ped*; here the peduncle or main flower stalk is shown at *p*, and the bracts are shown at *b*.

Peduncle, flower stalk.

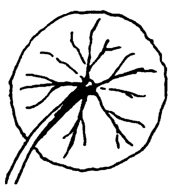

FIG. 79.—PELTATE.

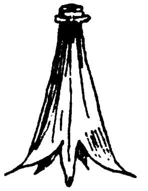

FIG. 80.—PELORIA.

Peloria, the term applied to the regular form of a usually irregular flower like the Common Toadflax (fig. 80).

Peltate, when the point of attachment is on the face, not at the edge, of a leaf or other organ (fig. 79).

Penninerved, Penniveined, when the veins of a leaf radiate obliquely and regularly from the midrib (fig. 81).

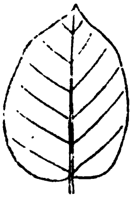

FIG. 81.—PENNIVEINED.

Pentagonal, with five angles having convex spaces between them.

Pentangular, with five angles and five flat or concave faces.

Perennial, of three or more years' duration, and flowering and fruiting each year.

Perfoliate, when the leaf completely surrounds the stem so that the latter seems to pass through it, as shown in fig. 82.

Perianth, the floral whorls when the calyx and corolla are not distinguishable, as in Tulips, Lilies, Orchids, Irises, Snowdrops &c., and many plants belonging to the Monocotyledons (p. 127).

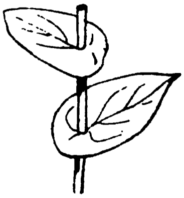

FIG. 82.—PERFOLIATE.

Pericarp, seed-vessel, including adhering calyx if present.

Perigynous, growing upon the throat of the calyx around or above the ovary, as shown in fig. 83.

Perisperm, another name for the albumen of the seed (see p. 25).

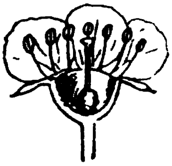

FIG. 83.—PERIGYNOUS.

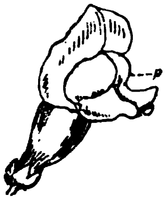

FIG. 84.—PERSONATE.

Persistent, not soon falling off, as the leaves of evergreens.

Personate, a gamopetalous two-lipped corolla of which the lower lip is pressed upwards so as to close the opening, as in the Snapdragon (fig. 84). At *p* the 'palate' is represented.

Petals, the divisions of the corolla.

Petal-like, resembling petals in texture and colour as in Clematis, Hellebores, Marsh Marigold &c., in which the sepals have assumed the functions and appearance of petals.

Petiolate, having a petiole or leafstalk.

Petiole, the stalk of a leaf as shown at *p* in figs. 64 and 98; **Petiolule**, the stalk of a leaflet.

Phænogamous, Phanerogamous, having manifest flowers (p. 121).

Phyllociades, branches assuming the form and functions of leaves (see **Cladodes**).

Phyllum, in composition, a leaf.

Pileus, the 'cap' of a Mushroom and other Fungi.

Pilose, with scattered rather stiff hairs.

Pinnæ, the segments of a pinnate leaf (fig. 85).

Pinnate, when leaflets are arranged on opposite sides of a common stalk (fig. 83).

Pinnatifid, a leaf deeply cut into segments nearly to the midrib (fig. 18).

Pinnatipartite, pinnate, with the divisions acute, and almost free, as in the leaves of the Corn Poppy.

Pinnatisect, pinnate, with the divisions reaching nearly to the midrib, as in the leaves of Water Cress.

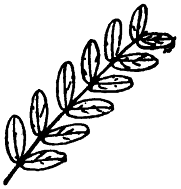

FIG. 85.—PINNATE.

Pinnules, the segments of pinnate leaves and fronds.

Pistil, the ovary, style, and stigma taken together. In fig. 55 *ov* represents the ovary, *st* the style, and *stig* the stigma. In fig. 109 the style—or portion between the ovary and stigma—is absent or very short.

Pith, the cellular tissue in the centre of Dicotyledonous stems.

Pitted, covered with small depressed spots.

Placenta, the process or body which bears the ovules in the ovary (fig. 86).

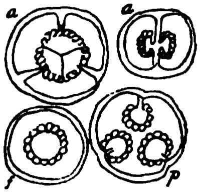

FIG. 86.—PLACENTAS.

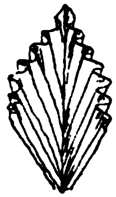

FIG. 87.—PLAITED.

Plaited, Plicate, folded in the manner of a closed fan, like many leaves before they are unfolded (fig. 87).

Plumose, feathery.

Plumule, the first or embryonic bud represented in fig. 48 at *p*.

Pod, a 1-celled and 2-valved seed-vessel with the seeds arranged along the inner angle. See **Legume** (fig. 69).

Pollen, the dust in the anther which serves to fertilise the ovules (fig. 9, *p*).

Pollination, the application of the pollen to the stigma, as described at p. 24.

Pollinium, the waxy pollen mass in Orchids (see fig. 32, *p*).

Polycarpic, fruiting more than once, several times (see p. 22).

Polygamous, a term applied to those plants having male, female, and hermaphrodite flowers intermixed on the same individual.

Polygonal, with many angles.

Polypetalous, with free, distinct, and separate petals, as in Buttercups, Roses, and most of the plants described from p. 131 to p. 477.

Polysepalous, with separate sepals.

Pome, the name given to such fruits as the Apple and Pear. In fig. 88 *st* represents the remains of the stamens in the 'eye' (*e*) of the fruit; *ct* shows the calyx tube; *en* the endocarp (core) within which are the seeds *s*; the fleshy edible part is represented at *m* (mesocarp), and *ep* the epicarp.

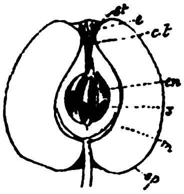

FIG. 88.—POME.

Pores, small, often roundish, holes.

Præcox, flowering early.

Pratensis, growing in meadows.

Prickles, hardened epidermal appendages resembling thorns, but not woody (see *aculeate*, fig. 3).

Procumbent, Prostrate, lying on the ground.

Prothallium or **Prothallus,** the flat deep green body resulting from the germination of a fern spore, and bearing male and female organs as explained at p. 1009. In fig. 89 the prothallium is shown at *p*, from the under surface of which are given off the rhizoids or root-like hairs, *rh*; and the first fern frond *f*, after fertilisation has taken place.

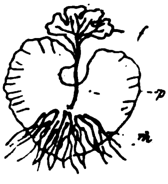

FIG. 89.—PROTHALLIUM.

Protoplasm, the living jelly-like contents of plant cells (see p. 22).

Pubescence, Pubescent, with closely adpressed down.

Pulverulent, covered with fine powdery matter.

Pumilus, short and dense in habit.

Punctate, having minute spots on the surface.

Putamen, the hard part or shell of stone fruit, like the Almond, Peach, Cherry, Plum (fig. 52, *s*).

Pyramidal, nearly in the shape of a pyramid, as shown at p. 1035.

Pyriform, Pear-shaped.

Pyxidium, a seed-pod or capsule opening horizontally by means of a lid, as in many plants of the Primula and Solanum orders. In fig. 90, *o* represents the operculum or lid; *s* the seeds; and *c* the calyx supporting the capsule.

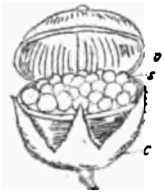

FIG. 90.—PYXIDIUM.

Quadrifoliate, with four leaflets diverging from the same point, as in *Paris quadrifolia* (p. 880).

Quinate, arranged in fives, as the leaflets of *Akebia quinata* (p. 179).

Raceme, a spike with stalked flowers, as that of the Laburnum, Currant, Wallflower &c. (fig. 91); *b* represents a bract; *ped* the stalklet or pedicel of the individual flower; and *p* the peduncle or main stalk of all the flowers in the raceme.

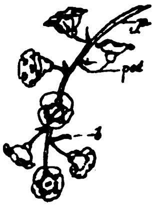

FIG. 91.—RACEME.

Racemose, flowering in a raceme.

Rachis, the central stem of some kinds of inflorescence. The stalk of the frond of Ferns above the lowest pinnæ.

Radical, springing from just above the root, said of the leaves of many low-growing tufted plants.

Radicle, the first root of a young plant emerging from the seed (fig. 48, *r*).

Ramosus, much branched.

Ray, parts diverging in a circle from a central point. **Ray-florets** are the outer strap-shaped ones, as in the Daisy and many other Composite plants.

Receptacle, the dilated top of the stalk bearing the flowers in Composites (see *Torus*).

Recurved, bent moderately backwards.

Reflexed, bent considerably backwards.

Regular, all the parts of each series of a flower alike, as in figs. 40, 59, 63, &c.

Reniform, transversely oval, but broadly cordate at the base; kidney-shaped (fig. 92).

Repens, creeping.

Reticulate, forming a network.

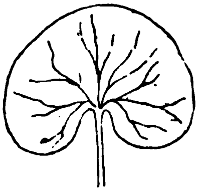

FIG. 92.—RENIFORM.

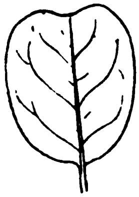

FIG. 93.—RETUSE.

Retuse, abruptly blunt with a notch in the middle (fig. 93).

Revolute, rolled back, as towards the under side of a leaf.

Rhizome, a thickish prostrate more or less subterranean stem producing roots and leafy shoots, as in Irises, Solomon's Seal &c.

Ringent, a 2-lipped widely open or gaping corolla, like that of the Dead Nettle (fig. 65).

Riparius, growing on the banks of streams or lakes.

Rootstock, a thick short rhizome or tuber. The term is loosely applied by gardeners to mean the clump, set, or mass of roots of an herbaceous perennial plant.

Rosette, a collection of leaves growing close together, and radiating from the main stem.

Rosulate, disposed in the form of a rosette.

Rotate, a monopetalous corolla with a short tube and very spreading limb (fig. 94), as in Potato and other flowers of the Solanum order.

Ruber, red of any tint.

Ruderalis, growing amongst rubbish.

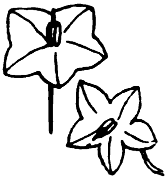

FIG. 94.—ROTATE.

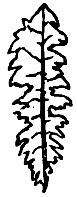

FIG. 95.—RUNCINATE.

Rugose, covered with a net of lines enclosing convex spaces, like the leaves of *Rosa rugosa.*

Rugulose, finely rugose.

Runcinate, where the lobes of leaves are directed towards the base (fig. 95).

Runner, a prostrate shoot rooting at its end, as in the Strawberry.

Rupestris, growing on rocks.

Sabulosus, growing in sandy places.

Sagittate, like the barbed head of an arrow, the auricles or lobes pointing backwards (fig. 96) not outwards as in *Hastate* (fig. 62).

Salver-shaped, a corolla with a long slender tube and flat limb, the same as **hypocrateriform** (fig. 63).

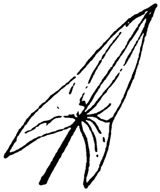

FIG. 96.—SAGITTATE.

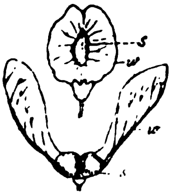

FIG. 97.—SAMARAS.

Samara, applied to such winged indehiscent fruits as the Ash, Elm &c. (fig. 97).

Saxatilis, growing on rocks or stones.

Scaber, scabrid, scabrous, rough to the touch.

Scales, minute rudimentary leaves or appendages to petals, as in many Pinks &c.

Scandens, climbing.

Scape, a leafless flower stem springing from the root, like that of Tulips, Hyacinths, Daffodils.

Scarious, with a thin, dry, shrivelled appearance.

Scorpioid, rolled up in a somewhat crosier-like fashion. See **Circinate.**

Secund, all turned towards one side.

Sempervirens, evergreen.

Sepals, the division of the calyx.

Septicidal (dehiscence), separating through the dissepiments (fig. 46, *b*).

Septum, the partition of an ovary or fruit.

Sericeus, silky.

Serotinus, late.

Serrate, toothed like a saw, like the margins of many leaves (fig. 98).

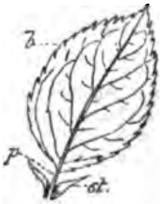

FIG. 98.—SERRATE.

Serratures, teeth like those of a saw.

Serrulate, with very small saw-like teeth.

Sessile, without a stalk, like many leaves.

Seta, a bristle; a bristle tipped with a gland; a slender straight prickle.

Setaceous, like a bristle.

Setose, bearing bristles or setæ usually ending in glands.

Sheath, the lower part of a leaf or its petiole, which forms a vertical sheath surrounding the stem.

Silicle, a silique about as long as it is broad (fig. 99).

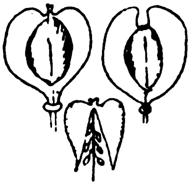

FIG. 99.—SILICLES.

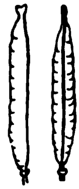

FIG. 100.—SILIQUES.

Silique, a long pod-like fruit of *Crucifers* having its edges connected by an internal membrane (fig. 100).

Simple, not compound; not branched, lobed, or divided.

Sinuate, having many large blunt lobes, as in Oak leaves (fig. 101).

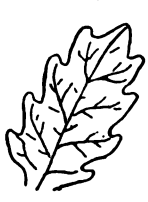

FIG. 101.—SINUATE.

Sinus, the recesses of a lobed organ, as shown in the leaf at fig. 101.

Smooth, free from all kinds of roughness.

Solitary, growing singly, said of flowers when only one is borne on the stalk.

Spadix, a succulent spike bearing many sessile closely placed flowers, as in fig. 99, where *b.st* represents the barren stamens; *f.st* the fertile stamens; *bp* the barren pistils; and *fp* the fertile ones capable of producing seeds.

Spathe, a large bract often inclosing a spadix, as shown in fig. 41; *s* is the spathe and *sp* the spadix.

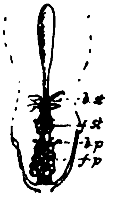

FIG. 102.—SPADIX.

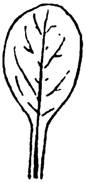

FIG. 103.—SPATHULATE.

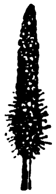

FIG. 104.—SPIKE.

Spathulate or **Spatulate,** oblong, with a long and narrow base; spoon-shaped (fig. 103).

Spike, a long simple axis with many sessile flowers like a raceme except that the individual flowers have no stalks; see fig. 104, representing the flower spike of Plantain.

Spikelet, the small group of flowers in Grasses enclosed within one or more glumes.

Spine, a stiff, sharp, woody, persistent thorn, as seen in Gooseberries, Barberries, Blackthorns &c.

Spinose, furnished with spines.

Spinulose, with small, often very minute spines or prickles.

Sporangium, a single spore case which contains the spores or seeds of Ferns. In fig. 105 *sp* represents the dust-like spores falling from the ruptured case; and *a* represents the stiffer ringed midrib or annulus (see **Indusium**).

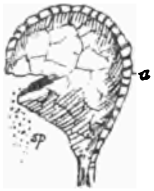

FIG. 105.—SPORANGIUM.

Spur, a tubular extension of the lower part of a petal or monopetalous corolla, as seen in Columbines and Tropæolum (fig. 22).

Squamatus, clothed with scales.

Squarrose, rough with projecting or deflexed scales.

Stamen, the male organ of a flower, usually formed of a filament and anther. In fig. 9, *f* represents the filament; *a* the anther shedding the pollen *p*; and *c* the connective or midrib between the 2 anther lobes. The connective is produced in one case, as in the stamens of *Paris quadrifolia.*

Staminode, rudimentary organs next to the stamens; usually barren or antherless stamens.

Standard, the upper or posterior petal of a Pea-flower which is outside the others in the bud, shown at *st* in fig. 5.

Stellate, radiating from a centre like a star; applied to flowers of which the petals are narrow and distant and radiate like the rays of a star.

Stellulate, like minute stars.

Stigma, the cellular part at the top of a carpel or style to which the pollen adheres, shown at *st* in fig. 1, and *stig* in figs. 56, 109.

Stipe, the stalk of Fern fronds up to the lowest pinnæ.

Stipitate, stalked; applied to carpels which are more or less slightly elevated on a stalk. A stipitate pappus is shown in fig. 78, *b*.

Stipules, leaf-like appendages at the base of the petiole, shown at *st* in figs. 64, 98, 111 (*s*).

Stolon, an offset or runner producing roots at intervals, as in Strawberry.

Strap-shaped, not very narrow nor long, and with nearly parallel sides; the same as ligulate.

Striate, with slender streaks or furrows.

Strobilus, a flower-head or cone consisting of several overlapping scales, as seen in many members of the Conifer order (p. 972).

Style, the slender termination of a carpel bearing the stigma, shown in fig. 83.

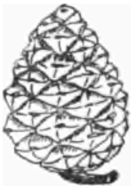

FIG. 106.—STROBILUS.

Sub, in composition means almost or nearly, somewhat; thus *sub-rotund* means nearly round; *sub-shrubby,* somewhat shrubby; *sub-orbicular,* roundish &c.

Subulate, awl-shaped, tapering from the base to a fine point, a long narrow triangle.

Sucker, a leafy stem produced at the end of an underground shoot, as with Plum trees, Lilacs &c.

Suffruticose, rather shrubby.

Sulcate, furrowed, like the stems of many Umbelliferous plants.

Superior, above anything; a calyx is superior when its tube is wholly attached to the ovary; half superior when attached only to the lower half of it; an ovary is superior when wholly free from and above the calyx.

Supra-decompound, subdivided many times.

Sylvaticus, Sylvestris, inhabiting woods.

Syn, signifies union or growing together, as *syncarpous*, when the carpels are consolidated, as shown in fig. 27, or *syngenesious*, when the anthers are united, as in most flowers of the Composite order.

Tap roots, roots with stout tapering bodies developed direct from the seed, like Carrots and Turnips (fig. 107).

Tendril, a twisting slender organ for laying hold of objects.

Tenuis, slender, thin.

Terete, applied to round or nearly round stems, like an ordinary lead pencil or goose quill.

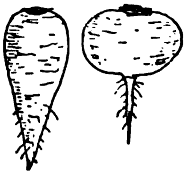

FIG. 107.—TAP-ROOTS.

Ternate, growing in threes, as shown in the portions of fig. 19, and in fig. 108, like the leaves of *Choisya ternata* (p. 296).

Testa, the outer skin of a seed.

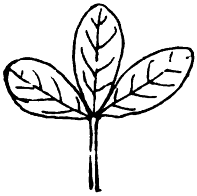

FIG. 108.—TERNATE.

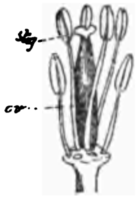

FIG. 109.—TETRADYNAMOUS.

Tetradynamous, having six stamens, of which two are shorter than the other four, as in the Wallflower (fig. 109) and most plants of the Crucifer order.

Tetragonous, with four angles and four convex faces, like the stems of Dead Nettles and many other plants of the Labiate order.

Thalamus, the receptacle or torus of a flower.

Thorn, an abortive branch with a sharp point; distinguished from a Prickle by being woody.

Throat, the orifice of the tube of a gamopetalous corolla or gamosepalous calyx.

Thyrsoid, having a close-branched raceme of which the middle is broader than the ends.

Tomentose, covered with cottony entangled hairs, forming a matted shagginess called *tomentum*; felted.

Toothed, having small tooth-like divisions on the margin.

Torus, the part on which the divisions of a flower or fruit are seated; the same as receptacle.

Tri, in compounds, signifies *three*.

Triangular, with three angles and three flat faces.

Trichotomous, in forks of three prongs successively repeated.

Trifid, when leaves are divided about half way down into three parts, as shown in fig. 110.

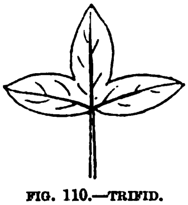

FIG. 110.—TRIFID.

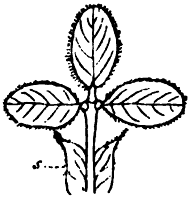

FIG. 111.—TRIFOLIATE.

Trifoliate, composed of three leaflets, as the leaves of Clover shown in fig. 111, where the leaflets are ciliated on the margins; the stipules at the base are shown at *s*.

Trifoliolate, having three leaflets proceeding from the same point, as in fig. 19.

Trigonous, with three angles and three convex faces.

Tripartite, divided into three parts nearly to its base; more than trifid.

Tripinnate, three times pinnately subdivided, as if the leaflets in fig. 17 were again divided.

Triquetrous, having three angles and three concave faces.

Tristis, dull-coloured.

Truncate, blunt as if cut off at the end, like the leaf of the Tulip tree (fig. 112).

Tube, the pipe formed by the cohesion of the petals in a gamopetalous corolla, as shown in fig. 63, *t*.

Tuber, a thickened and underground fleshy part of the stem, as the Potato and Jerusalem Artichoke.

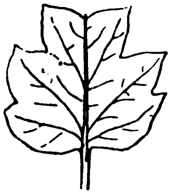

FIG. 112.—TRUNCATE.

Tubercles, little round knobs.

Tubercular, tubercled, tuberculate, covered with little knobs.

Tuberous, like a tuber, but not part of the stem.

Tubular, hollow and nearly cylindrical, something like *fistular*.

Turbinate, top-shaped, conical and attached by its long point, like many Pears.

Uliginosus, inhabiting swampy places.

Umbel, when many stalked flowers spring from one point and reach about the same level, as in fig. 113. *Partial* umbels are umbels seated upon the branches of an umbel, the whole forming a *compound* umbel.

Umbrosus, growing in shady places.

Unarmed, where stems and leaves are destitute of spines or prickles.

Undulate, having a wavy margin.

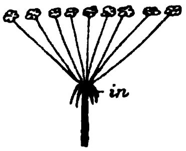

FIG. 113.—UMBEL.

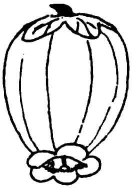

FIG. 114.—URCEOLATE.

Unilateral, turned to one side.

Urceolate, like a pitcher contracted at the mouth, like the flowers of many Heaths, as shown in fig. 114.

Urens, stinging, as the hairs of the common Stinging Nettle.

Valvate (æstivation), sepals or petals meeting at the margins, but not overlapping each other, as shown in fig. 115.

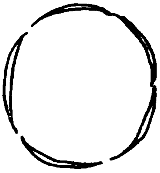

FIG. 115.—VALVATE.

Veins, the nerves in leaves and their ramifications, as shown in figs. 34 &c.

Velutinous, velvety, as the surface of leaves.

Ventral, the anterior part of an organ.

Ventricose, swelling unequally on one side, somewhat like the corolla of Valerian shown in fig. 60.

Vernalis, produced in spring.

Vernation, the arrangement of the leaves when in bud.

Verrucose, warty.

Versatile, affixed in the middle, applied to anthers like those of Lilies which swing backwards and forwards with the movement of the air. In fig. 9 a versatile anther is shown in the middle.

Verticillate, arranged in whorls.

Villous, shaggy with loose long soft hair.

Virens, green.

Virgatus, twiggy.

Viridis, clear full green.

Viscous, clammy.

Volubilis, twisting.

Wedge-shaped, like a wedge, but attached by its point.

Whorl, whorled, similar organs arranged in a circle round an axis, as the leaves of *Galium*, *Asperula* (fig. 116), and of some Lilies.

Winged, having leaf-like or membranous expansions, like the stems of many Thistles.

Wings, the lateral petals of a Pea-flower, as shown at *w* in fig. 5; the flat membranous appendages of some seeds.

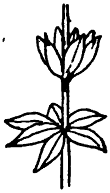

FIG. 116.—WHORL.

Zygomorphic, said of a flower which can only be bisected in one plane so as to show two similar halves. Most Orchid flowers bisected vertically are zygomorphic, as are also many flowers of the Labiate family (p. 742), the Aconite (p. 162) &c.

INTRODUCTION

The cultivation of plants at the present day has been brought almost to the highest point of perfection. Far greater attention is now given to the problem as to how the finest Flowers, Fruits, and Vegetables can be produced in the best way at the least cost than at any previous period in our history. The whole country is alive to the importance and necessity of making the land produce as much as possible in the best possible way. County Councils are lavishing money to have gardening taught either in schoolrooms or in gardens, but as yet have not decided upon any definite plan whereby those taught are likely to obtain any or much benefit from what they learn. And yet, it is a curious fact that, although we know a good deal more about plants now than our ancestors did, and though thousands of plants, natives of all parts of the world, are grown in our gardens that were quite unknown to them, still there has been practically but little change in the principal methods of cultivation. The importance of tilling and manuring the soil and bringing it into a state of fertility has been recognised from the earliest ages, while little or nothing was known of its nature and composition, or the chemical changes that take place in it, or that are produced by rain, heat and cold, &c. The proper times for Digging, Planting, Sowing seeds, and various other operations were also well known, and modern gardeners still continue to work on the same old lines. The ancients were also acquainted with the arts of Budding, Grafting, Layering, Pruning, Thinning Out, Transplanting &c., and all these operations were alluded to as commonplaces by the poet Virgil before the Christian Era in his well-known *Bucolics*. It thus appears that, notwithstanding the march of time, the principles of cultivation remain the same in all ages, and gardeners have only to apply them with a fair amount of common sense, and attention to details necessitated by the nature of any particular plant.

Although, unhappily, a good knowledge of plants, their structure and requirements, does not necessarily mean that a person with this knowledge is also a good cultivator, it is nevertheless true that a gardener who turns such knowledge to practical use has a much better chance of producing fine flowers, fruits, and vegetables than he who is not so well equipped in this respect. Many gardeners—amateur and professional—are like poets: they are born and not made; they seem to know instinctively and exactly how to cultivate any particular plant; or if they do not, it is not very long before they find out. Without knowing it, such gardeners carry out the true principles of cultivation, which after all are in strict accordance with natural laws, and therefore the more one studies the nature of a plant and its requirements the sooner will he be able to grow it to perfection in his garden.

Before one can hope to grow a plant of any kind satisfactorily it is obvious that at least some knowledge is required in regard to the functions of the various parts of plants, the soil and its composition, and treatment, and many other details. An attempt has been made in this direction with a view to giving the reader information that may be of use to him in the garden. It is most important to have a clear idea as to the functions of the Roots, Stems, Leaves, Flowers, Fruits, and Seeds, as this will prevent many mistakes in cultural treatment. A doctor who did not understand the anatomy of his patient, and what he required to keep him in good health, would be a sorry practitioner. So with the person who would grow plants successfully. He must understand them, he must know something about their relationship to each other, the countries in which they grow wild, the kind of soil that suits them best, whether they prefer sunshine or shadow, moist or dry situations, and how best they may be increased so that they shall not die out of cultivation altogether, either through old age, ill-treatment, or other causes.

PART I

THE LIFE HISTORY OF CULTIVATED PLANTS

From a gardening point of view cultivated plants may be said to be constructed on a common plan, although there is a vast variation in details. Speaking generally, most plants are characterised by having Seeds, Roots, Stems, Leaves, Flowers, and Fruit, and may be annual or biennial herbs, or herbaceous or woody perennial plants.

Whatever group they belong to, their corresponding parts are constructed on the same principle and perform the same functions.

As the good cultivation of plants depends to a very large extent upon a more or less intimate knowledge of their nature, it may be useful if a brief account is given of the various organs mentioned above.

GROWTH OF PLANTS

Perhaps one of the first things people notice about plants is that they *grow*. Plants, somewhat like human beings and animals, are living objects, and are affected in much the same way by heat, cold, moisture &c. They also are to be found in all parts of the world, and according to the climate in which they grow are looked upon as being more or less hardy or tender. They pass from what may be called the infant or seedling stage to maturity, and then more or less slowly or quickly begin to decay and ultimately die. They have a complete cycle of existence, and this cycle is completed by some in a much shorter time than others. Annuals and biennials for example complete their cycle of existence in one or two years, but others like herbaceous perennials, trees and shrubs &c., exist for several years before the individual becomes exhausted. And yet while an individual plant may pass from the seedling stage to death in one or more years, according to its nature, as a rule it makes provision for reproducing itself again before actually dying. This process of reproduction is naturally carried on by means of seeds. Some plants like annuals and biennials bear only one crop of seeds and then die. Plants with these characteristics—that fruit only once—are said to be *monocarpic*.

Other plants, however, which may live for very many years, like some of the American Aloes, also fruit or produce seeds only once in a lifetime and then die. These are also said to be *monocarpic.* Nearly all our hardy herbaceous perennials, and woody perennials like trees and shrubs—Apples, Pears, Plums, Oaks, Ashes, Beeches &c.—fruit or produce seeds year after year for several generations, and are therefore said to be *polycarpic.*

It little matters, however, whether plants be annuals, biennials, or perennials, whether they produce only one crop of seed or many, they are all governed by the same laws of *Growth.*

Plant-cells.—To give the reader a better idea of how this process called growth takes place, it is necessary to point out that plants are made up of cells and tissues. Some plants, indeed, like the green Protococcus seen on damp walls, the mould on old leather &c., are very simple in their structure and often consist of one cell only. And it is in the contents of the individual cells, the presence of which was discovered in 1667 by Robert Hooke, that we must look for the origin of growth.

Protoplasm.—Every plant cell in a young stage is filled with a slimy jelly-like substance to which the name of *Protoplasm* was given in 1846 by a German botanist, Hugo von Mohl. This protoplasm is practically the seat of life. It is constantly undergoing more or less rapid changes in composition, absorbing new food, digesting it, and expelling all waste or worn-out materials. When the cells are young they are completely filled with it, but as they grow old the protoplasm begins to break up into strands, leaving spaces in between which become filled with watery sap absorbed and drafted up by the roots. By-and-bye the protoplasm recedes from the centre of the cell to line the cell walls, and ultimately vanishes altogether with age, the refuse from it going to make the cell walls thicker and harder, and producing what we know as wood or fibre.

Before this stage is reached, however, the protoplasm, or rather the central portion of it called the *nucleus,* divides and forms a new cell. This, like its parent, becomes surrounded with a cell wall, and then becomes practically an independent individual working out its own life history in the same way. When it is remembered that plants are made up of millions of these cells containing protoplasm, and that with the advance of age each mass of protoplasm is capable of propagating itself by division, it is not so very difficult to account for what we understand as growth—how plants often attain enormous heights, and the trunks of trees great diameters—according to their nature.

Although each mass of protoplasm is as it were completely enclosed within its own cell walls, it is not, however, cut off from all communication with the protoplasm in the neighbouring cells. It is supposed that thin microscopic strands of protoplasm pass through the cell walls from one protoplasmic mass to another, and also that the fluid from a well-filled or turgid cell is diffused through the cell walls into a comparatively empty one by a process which has been termed *osmosis* or *endosmosis*, and that in this way the cell-sap is drafted to the outermost points of the shoots of plants no matter how tall. As the protoplasm in each cell is therefore dependent for its support on the food dissolved in the cell-sap it naturally follows that no solid substance can possibly enter as such into the system of a plant. The protoplasm is formed, or forms itself, out of the food which has been absorbed in a liquid state, and it then proceeds to build up the various tissues of the plant which we know as shoots, stems, leaves, flowers &c. When the liquid or watery sap in the cells becomes excessive it is exhaled or breathed out into the atmosphere in the form of vapour by means of the pores of the leaves referred to below under 'Transpiration' at p. 34, and fresh supplies as wanted are absorbed by the roots, but only under favourable climatic conditions. To sum up, the whole plant is dependent on the work of the protoplasm, and so long as this continues to perform its functions, so long will the plant live and produce in due course its flowers and fruits. Anything therefore that tends to interfere with the work of the protoplasm, such as too much heat or cold, too much drought or moisture, too much light or shade, also stops the *growth* of the plant, and until proper conditions are restored the plant is likely to die because the protoplasm cannot perform its work in a satisfactory manner.

The great aim of the gardener, therefore, is to choose the most favourable conditions for his plants so that there will be no interference or check to the mysterious work carried on within the cell walls by the protoplasm. If a plant comes from a tropical climate, he endeavours to imitate the natural warmth by growing it in a hothouse, as he very soon discovers by the drooping and withering leaves and stems that a cool temperature will be injurious. In the same way plants from cold regions will be injured by excessive heat. As this work, however, only deals with plants which will grow in the open air in our own climate, the reader need not concern himself much about artificial heat, although he will find many cases in which he is advised to use hotbeds for raising seeds &c., and to place his plants in the warmest and sunniest, in the coolest and shadiest, in the driest or dampest positions in his garden; but these instructions are all based upon this one principle of placing a plant under the circumstances most favourable to the work to be performed by the protoplasm in the cells.

THE SEED

It has been stated above that the growth of a plant takes the form of a cycle, and it is therefore difficult to take any one organ and say 'growth begins here.' This cannot be said of the root, as it is the outcome of the seed; it cannot be said of the leaves, as they are outgrowths of the stem; and it cannot even be said of the seed, which is produced by the ripened fruit. As, however, for practical purposes it is necessary to start somewhere, the most logical beginning from a gardening point of view seems to be the Seed, which we will therefore consider.

Many years ago, the late Dr. Lindley described a seed as being 'a living body, separating from its parent and capable of growing into a new individual of the same species. It is a reproductive fragment, or vital point, containing within itself all the elements of life, which, however, can only be called into action by special circumstances.'

As popularly understood, seeds are only produced by Flowering Plants or 'Phanerogams' (p. 121). They are the result of the ovules (either naked, as in the Pine order; or enclosed in carpels, as in most other Flowering Plants) being fertilised by the pollen tube. Each fertilised seed contains an embryo, or the rudiments of a young plant. When placed in a suitable temperature, with moisture, they are capable of reproducing all the characters of their parents. The so-called 'seeds' or spores of Ferns differ very much from those of Flowering Plants, and the way in which they are reproduced is explained at p. 1009.

The process of forming seeds takes place somewhat in this way. When the grain of dust or pollen from an anther in the flower falls on to the stigmatic surface of the carpel, the grain of pollen begins to grow much in the same way as a seed in the soil, with the exception that all the growth is downwards. A microscopic thread called the pollen tube makes its way from the pollen grain downwards through the tissue of the carpel, and eventually reaches the ovule contained within the walls of the ovary. At one end of the ovule there is a small hole called the *micropyle*. The pollen tube enters this and comes in contact with a cell much larger than the others called the *embryo-sac*. Within the embryo-sac and close to the micropyle are three other cells, one of which called the *egg-cell* or *embryonic vesicle* receives the contents of the pollen tube and is thus fertilised. This operation, sooner or later, results in the production of what is commonly known as a seed. After fertilisation, the nuclei in the masses of protoplasm in the cells divide as explained above and form new masses, and thus fill up the interior of the embryo-sac. Eventually the embryo, or young plant, fills up the entire space within the seed coats as in the case of the Pea, Bean, Horse-Chestnut, Oak &c.; or it may occupy only a very small space as in Wheat, Onion &c., and remain imbedded in a substance at one time called *albumen*, but now more generally called *perisperm*.

When the embryo occupies the whole seed, as in the case of the Bean &c., all the reserve material for the purpose of nourishing the young plant is stored up in the fleshy seed-leaves or *cotyledons*, and it is from these that food supplies are drawn until the young root has developed sufficiently to absorb food from the soil, after germination has taken place. In the case of other seeds, however, like those of the Wheat and Onion, the young plant is fed upon the albumen or perisperm, and not on the seed leaves, until roots are formed.

Germination.—Seeds germinate as the result of a certain amount of heat, moisture, and air. The seeds of some plants germinate in a much lower temperature than others, but there is a certain point called the 'optimum' at which seeds of any given plant will sprout more readily than at a point below or above it. The best or 'optimum' temperature for germination varies according to the nature of the plant or species, and the gardener learns by experience which temperature is most suitable for raising the seeds of any particular plant. He knows for instance that the seeds of many plants will sprout sooner if they are sown upon a hotbed than if they are sown in the open ground where the temperature may be 10° or 20° lower. He also knows that a certain amount of moisture is absolutely necessary, and that the free circulation of air between the particles of soil shall not be impeded, as he usually takes particular care to have the soil well drained, so that the water and consequently the air shall pass through it freely. Speaking generally, the seeds of most of the plants described in this work germinate readily either out of doors in autumn or spring; in cold frames without artificial heat; or in the gentle heat of a hotbed or greenhouse, say 60° to 70° F. or even less.

Heat and Cold.—When a seed 'sprouts' or germinates as a result of the suitable conditions referred to above it is obvious that *growth* is taking place. It undergoes a change from the apparently dried condition in which it was before its contact with moisture or suitable heat. In fact, heat is the prime mover of life in the seed; hence by the use of hotbeds or frames or greenhouses several degrees more heat are obtained than out of doors. Chemical changes take place in the seed; water is absorbed from the soil through the seed coats; the latter are soon unable to contain their swollen contents and consequently burst. The first seed-leaves are pushed upwards through the soil, and the tiny rootlet downwards into it. These signs are simply an indication of the work that is being done by the protoplasm in the cells as already explained. From the water absorbed through the seed-coats, the protoplasm receives a supply of food and proceeds to manufacture it, with the result that the nuclei in the masses of protoplasm divide and produce other nuclei, and these again in due course carry out the same process, not only until a plant is fully developed but until it dies.

Vitality of Seeds.—Some seeds retain their vitality for several years—that is, their power of germinating does not appear to be much injured by being kept a long time—while others very soon lose it. For practical purposes it is preferable to obtain fresh and thoroughly ripened seed to secure the best results. The stories as to the germinating power of mummy-wheat 2,000 years old are fables, but many seeds will retain their vitality and produce good plants after careful storing for 5 to 10 years.

THE ROOT

To the ordinary observer every part of a plant which happens to grow naturally underground is regarded as a 'root.' This looseness of expression is not altogether confined to the uninitiated, as the term 'roots' is also applied by florists and nurserymen to entire plants, such as Pansies, Violas, Sweet Williams, Foxgloves, Double Daisies, and many other plants in which a large trade is done during the spring months. At present, however, we are chiefly concerned with real roots, and it is necessary that the gardener should have a clear idea as to their origin and function.

The first Root is the downward growth from the lower end of the 'caulicle' or basal portion of the embryo. It usually breaks through the seed coat at germinating time, before the cotyledons emerge to the light, the object in view by nature evidently being that the young plant should be provided with roots as early as possible after growth has commenced in the seed. When the first root persists and continues to grow it becomes what is known as a tap-root, and is present in all Dicotyledonous plants (p. 131 to p. 805) raised from seed. Good examples are seen in the Carrot, Parsnip, and Beetroot as represented at fig. 107 in the Glossary. As the tap-root in many plants has a tendency to grow down into uncongenial and sterile parts of the soil, it may be prevented from developing in a downward direction by more or less frequent transplanting; this injures the tip, stops its growth, and causes the more desirable fibrous roots to develop from the sides. Roots branch in all directions and apparently without system, and become finer and more threadlike towards the tips. They usually avoid the light, bear no leaves or buds, and are generally of a pale or whitish colour although sometimes with coloured juice.

Functions.—The main function of the root is to obtain liquid food from the soil. The tips of the root are chiefly concerned in this work, the older portions merely serving as holdfasts for the plant, and as channels for conveying the food to the stems and leaves. The extremity of each root-fibre is covered with a cap, formerly called a 'spongiole,' which protects a mass of young and active cells forming the 'growing point.' As the roots push their way in a somewhat corkscrew-like fashion through the soil, the outer layers of the root-cap wear out and are replaced from within by the discarded layers of the growing point. The contents of the cells of the growing point are very sensitive to heat, cold, and moisture, and under favourable conditions absorb water and whatever plant food is dissolved in it in large quantities. During the spring and summer they are most active, gradually subsiding towards autumn and becoming almost inactive in winter. When plants are moved during the active state of growth most of the root-tips are injured or broken, and the supply of food and water is cut off from the plant until new roots are formed. Sometimes plants moved at this period never recover from the shock to the roots and, being unable to produce new ones quickly enough, die, practically of starvation and drought.

Many roots have root-hairs. These are developed chiefly on land plants to assist in obtaining water more quickly from the soil. In water-plants root-hairs are usually absent. But the roots of such plants (*e.g.* the Watercress) grown on land soon develop root-hairs.

From the above remarks it is obvious that one of the chief things necessary to enable roots to perform their work properly is water. Without moisture in the soil the roots are useless, and the entire plant collapses in consequence. From a gardening point of view, therefore, the greatest attention should be paid to the watering of plants, some requiring more and some less, according to their nature. Whether the water which is absorbed contains plant food or not depends a good deal upon the operations of the gardener. It is possible that many of the foods referred to at p. 70 are in the soil, but they must be readily soluble in water, and also be in a fit state to benefit the plant.

Besides the substances absorbed in the water, root-tips and hairs absorb substances otherwise insoluble in water, and cling tenaciously to particles of minerals. They exude an acid secretion which dissolves the mineral matters, and these are thus modified so as to become digestible, and readily pass through the cell-walls into the protoplasm referred to above.

Root-pressure.—It is well known—indeed obvious—that the tallest tree in the world has water drafted to its highest point. This is an extraordinary fact when it is remembered that the Giant Sequoia of California and the Gum Trees of Australia often reach the great height of 400 to 500 ft. The tips of branches being naturally the youngest and tenderest parts of a plant are always well supplied with water. How the water gets to the outermost tips is a debatable matter and many theories have been suggested; but the fact remains that it gets there, and the propelling force has been termed 'root-pressure.' It is supposed that the water from the fully charged lower cells diffuses or filters through the partitions or walls into the upper cells by a process called 'osmosis,' referred to above under the chapter on 'Growth.' It can hardly, however, be a mere physical process, as each living cell in a plant contains the living substance called protoplasm already referred to. As each cell containing protoplasm is more or less supplied with watery juice from the roots, it is evident that a vast quantity of moisture is thereby taken from the soil, and passes from cell to cell by root-pressure. When trees and shrubs are cut in spring during the period of great absorption, large quantities of water are sometimes forced from the cut surfaces, and constitute what gardeners call 'bleeding.' This, if carried to excess, would be injurious, if not fatal, to the plant; but the surplus overflow as a rule soon becomes checked by the development of fresh leaves, the cells of which must be supplied with sap, and serve to stop the overflow from any wounds.

Kinds of Roots.—Roots, while all performing the same functions, differ a good deal in appearance. Broadly speaking they may be classified as *fibrous*, *fleshy*, and *tuberous*. All grasses and many annuals, biennials, and herbaceous plants have fibrous roots, while the Dahlia may be taken as an example of a plant with fleshy roots. What are termed 'adventitious' or accidental roots are those developed from any part of the plant except the seed. The roots of cuttings, layers, stems, &c. are therefore all adventitious. In the case of Monocotyledonous plants (see p. 127) the primary root from the seed soon ceases to grow, and all the roots afterwards developed are from the stem, and are hence mostly adventitious. Their functions, however, are precisely the same as those of the true roots developed directly from the seedling.

The tubers of Potatoes and Jerusalem Artichokes, the rhizomes or rootstocks of Irises, the corms of Crocuses and Gladioli, and the bulbs of Onions and Lilies, although all naturally growing in the soil are not really roots at all but modified stems, and are referred to below.

THE STEM

The stem is the axis of the plant which bears leaves, flowers, and fruit so that each shall be in the most favourable position for performing its functions. The leaves are separated from each other by greater or less distances called internodes. Sometimes these internodes are so short that the plant appears to be stemless or almost so, as in the Primrose and Houseleek. Stems always originate in a bud, the first one arising between the seed-leaves from the small bud known as the *plumule*. Branches arise also from buds in the axils of leaves, and this gives the spreading habit so characteristic of trees and shrubs, all belonging to the Dicotyledonous and Gymnospermous groups of plants (see p. 122). Among the Monocotyledons (p. 127) and Ferns (p. 1008) buds at the end of the stem only are developed, hence the usually unbranched character of their stems.

In the lower orders of plants, such as Seaweeds, Liverworts, Mushrooms &c., stems are unknown. The first trace of a stem appears in the Mosses, and becomes more marked in the Clubmosses (p. 1024), Horsetails (p. 1023), and Ferns (p. 1008); but the stem as generally understood attains its greatest development in the plants belonging to the flowering groups, as seen in the Oak, Apple, Beech, Elm, Pine &c. Whether they are herbaceous, that is, soft, tender, and deciduous as in annuals and biennials (p. 78), and herbaceous perennials (p. 86), or woody as in trees and shrubs (p. 107), the stems of all flowering plants have their origin in the 'plumule' or first bud of the embryo plant.

STRUCTURE OF STEMS

Besides the differences in stems referred to below, it may be mentioned here that there is a very marked difference in the structure of the stems of Dicotyledonous plants (p. 122) and those of Monocotyledons (p. 127). An examination of the stem of a Willow, Apple, Fuchsia, Wallflower, or any other plant belonging to the Dicotyledonous group will show in transverse section that it consists of three distinct parts, viz. (i.) the pith in the centre; (ii.) then the wood; and (iii.) the bark or rind outside. The bark is readily peeled off, especially when the sap is flowing upwards in spring, and it leaves the white wood exposed to view. On the outside of the wood and next the bark is a very important layer of quick-growing and actively dividing cells called the 'cambium layer.' As long as ever a Dicotyledonous plant lives, this cambium layer has the power of doing two wonderful things: it adds by division of the cells a layer of wood on the inside every year, and a layer of bark on the outside, and it is by this process, which goes on year after year in woody stems, that the latter increase in bulk. It thus happens that the youngest part of the wood of a tree trunk is on the *outside* beneath the bark, and not in the centre near the pith; while the youngest bark is next to it and not on the extreme outer surface. It is the addition of a layer of wood each year to that already existing that gives the ringed appearance to tree trunks, each ring representing one year's growth.

If a strip of bark be taken off all round the trunk or branch of a tree without injuring the wood, it will be found that the leaves do not shrivel up or wither, as one might expect, as a result of the operation. It is evident, therefore, that the sap from the roots ascends by the vessels in the cambium and young wood, and not by means of the bark, nor yet by means of the pith or the old inner wood, as is indeed obvious when one sees a huge Elm, Willow, or Oak with all the interior scooped out of the trunk. It will also be noticed that, if a branch has a string tied round it firmly, the portion above the string will become swollen. This shows that the elaborated or assimilated food made by the leaves returns down the stem by the outer cells, and as these are compressed at the tie the descent of the nutritive material is checked at that point and the cells above become gorged.

There are many other kinds of cells and vessels in the stems of Dicotyledonous plants, some being spiral, like compressed watch-springs, some cylindrical with slits or holes in the sides, or only at the base where they join another vessel, and so on; and running through them all from the central pith or 'medulla' to the circumference are rays known as 'medullary' rays, popularly known as the 'silver grain' in wood.

All the cells and vessels in a stem are not of the same nature: some are very tender like those of the cambium, some tough like those of the bast cells, and others fibrous or woody. The latter are seen in the principal nerves or veins of leaves, and are gathered together into bundles. Each leaf is connected with the stem by means of these fibrous bundles, and as the leaves are arranged all round the stem it is obvious that the fibre-bundles from them collect and form a circle round the stem. The traces of these fibre-bundles from the leaf into the stem are well seen in the scars left by the fallen leaves in autumn, as in the Horse-Chestnut and other trees.

Such are briefly the main points in the structure of the stems of Dicotyledonous plants, and they are referred to here chiefly because a knowledge of them is necessary for the operations of Budding and Grafting described further on.

In the stems of Monocotyledons we find a different structure, the most striking feature being the absence of real pith, wood, and bark. There is no cambium layer, and consequently no concentric rings of wood and bark as in Dicotyledons, and the fibrous bundles are chiefly collected on the outer portions of them, and give them the hard texture so well known in the stems of Bamboos and Canes.

As it is the presence of the cambium layer which enables grafting or budding to be done at all, it therefore follows that these operations cannot be performed satisfactorily on Monocotyledons which have no cambium layer in their stems.

KINDS OF STEMS

Stems are usually regarded as being above the soil, but there are certain modified kinds which perform their work beneath the surface, and are popularly looked upon as roots.

Those above the surface are classified as follows:—

1. *Herbaceous.* These are stems which die down to the ground every year after blooming, as in the case of most hardy herbaceous perennials (see list, p. 86).
2. *Sub-shrubby*, more or less woody below but herbaceous above.
3. *Shrubby*, *arborescent*, or *arboreous*, woody, and living from year to year, and attaining considerable size as in the case of trees and shrubs, a list of which is given at p. 107.

Stems assume various directions in growth, some being erect and ascending, others more or less trailing or prostrate on the ground, others creeping and developing roots at the joints, where they touch the soil; and others climbing or twining by tendrils, as in the Passion Flower and Virginian Creeper; by twisted leaf-stalks, as in the Clematis, or by aerial rootlets, as in the Ivy.

Stolons are stems or branches which recline on the earth and take root. Many plants are naturally increased in this way and the process of layering was no doubt suggested by seeing stems throw out roots when in contact with the soil.

An *Offset* is a short stolon with a tuft of leaves at the end, from which roots also develop, as seen in the common Houseleek.

Runners, as in the Strawberry, are similar in their nature, being long slender stolons which when fully grown develop roots at the tip, and afterwards buds and leaves to form a new plant.

Tendrils are branches modified for climbing purposes, and are either simple or branched, but are useless for propagating purposes.

Spines or Thorns are also modified branches or leaves; but the prickles of the Rose and Blackberry are merely excrescences or cellular outgrowths of the stem.

Underground Stems.—Perhaps the best known form of an underground stem is that of the Flag Iris (p. 917) and Solomon's Seal (p. 811). They look like real roots but the leaf-like scales and buds show them to be stems by nature. Many plants have underground and more or less creeping stems, as in Lily of the Valley (p. 813), Mint (p. 744), and Couch-grass, the latter on this account spreading rapidly and becoming a nuisance, especially when chopped by hoeing &c.

Underground stems are often thickened and serve as storehouses for food during the winter in many plants with herbaceous stems. They take many shapes, among which may be mentioned:

The *Tuber*, as in the Potato (p. 1133), the Jerusalem Artichoke, the 'eyes' of which are leaf-buds from which stems arise (p. 1140); the *Corm* or *Solid Bulb*, as in the Cyclamen (p. 626), Crocus (p. 936), and Gladiolus (p. 947); the *Bulb*, as in the Madonna Lily (p. 846), the Tulip (p. 860), Hyacinth (p. 833), Onion (p. 1148) &c.

In some plants the stems are so modified in form and structure that they perform the functions of the foliage. The stems of many cactaceous plants are of this nature, and also the branches of the Common Butcher's Broom (see p. 810) which resemble leaves in appearance.

THE LEAVES

From definite points (called nodes or joints) of the stem and branches leaves are developed and arranged more or less horizontally, vertically, or drooping so as to obtain a greater or less amount of sunshine, and to throw water towards or away from the main axis of the plant, according to the nature of the species.

It will be noticed for example that the leaves of Rhubarb (p. 770), Arum Lily (p. 955) and other plants have the tips of the leaves uppermost. They are more or less channelled down the centre, and water is by this means transferred towards the centre of the plant, and down the stem to the roots. In such plants it will generally be found that the roots do not spread over large areas but are confined in a small space beneath the centre of the plant. Many other plants on the contrary, like most of our trees and shrubs and flowering plants, have the leaf-tips pointed outwards and downwards so as to throw the water chiefly around the circumference of the plant and away from the centre. In plants with these peculiarities the roots spread out and away from the centre in all directions, and usually go beyond the circumference of the foliage. In this way the active fibrous roots secure the full benefit of the rain which is thrown off the leaves.

A complete leaf consists of a flattened portion, called the *blade*; a *stalk* or *petiole*, and a pair of more or less scaly or leafy appendages called *stipules*, all of which characters are illustrated in the Glossary at fig. 98. The stalk and stipules are frequently absent, leaving the blade attached to the stem by the base, when it is said to be *sessile*. As a rule, when fully developed, leaves cease to increase in length or breadth, and remain unchanged in form until death, when they are removed by natural decay, as in most Monocotyledonous plants (p. 127), or by breaking off at a joint, as in most Dicotyledons (p. 122).

Some leaves develop and die in one season, and are called deciduous; others persist for two or more seasons before falling off, new ones in the meantime being formed, thus giving the plant an evergreen appearance.

The tissue of the blade is traversed by a framework of stronger ribs or veins more or less netted in Dicotyledons, as shown at fig. 48 in the Glossary, p. 7, and parallel or curved in Monocotyledons, as shown at fig. 96 in the Glossary. The beautiful arrangement of the veins is well seen in leaves which have been skeletonised—that is, when the more perishable tissue (called *parenchyma*) between the veins has decayed through artificial or natural agencies. These veins serve not only to strengthen the leaf-blade, but also as channels through which the sap from the root is distributed to the cells composing the blade.

Structure of Leaves.—Ordinary leaves consist of an upper and under surface between which are layers of cells more or less irregular in shape and filled with grains of green colouring matter known as *chlorophyll* floating about in the protoplasm (see p. 22). The cells near the upper surface are much more compactly arranged than those beneath, hence the more intense green of leaves above. Where leaves receive an equal amount of light, as in Irises, Gladiolus, and many other Monocotyledons, there is not a great difference in colour between the two sides.

The skin, cuticle, or epidermis of the leaf is studded with small openings or breathing pores, known as *stomata*. These are more numerous on the under surface, and it has been computed that there are as many as 60,000 of them to the square inch in a Lily leaf, and about 100,000 to the square inch on that of an Apple leaf. The leaves of water plants present a striking difference from those of land plants. Those under water are more or less divided and are so thin in texture that they can absorb the necessary food or throw off surplus gases through the walls of the cells instead of through stomata. Those floating on the surface have stomata above, but none or very few beneath.

Functions of the Leaf.—The most important work of the leaf is to construct, manufacture, 'elaborate' or make digestible food for the plant out of the raw materials in the sap, and to give off through its pores surplus gases and watery vapour.

It is only under the light of the sun that the living protoplasm in the cells of leaves is capable of changing mineral matters and gases into plant food. From the air carbonic acid gas is taken in through the pores in the leaf and is absorbed through the cell walls by the protoplasm in the cells. The carbon is retained and the oxygen is given off. This process of manufacturing food is called *assimilation*, and may be likened to what is known as digestion with human beings and animals. By its means starch, sugar, oils and various other substances found in plants are obtained, and constitute the food of man and animals. The absorption and liberation of gases by means of the pores is known as *respiration*, owing to its being somewhat akin to the breathing of animals, the great difference, however, being that plants breathe out oxygen during the day instead of carbonic acid gas, and thus keep the air in a purified state.

Transpiration.—Almost every part of a living plant is continually giving off vapour from its tissues, although the quantity varies with atmospheric conditions. When in active growth the roots often absorb more water from the soil than is actually needed, and the surplus is given off into the air by means of the stomata in the leaves and minute pores in the stems. This continual discharge of watery vapour is known as transpiration, and according as the cells become emptied by evaporation they absorb fresh supplies from contiguous cells by means of the process already referred to as Osmosis, see p. 23.

Whether large or small quantities are given off depends a good deal upon the wetness or dryness of the atmosphere, and upon heat and cold —that is, practically on the state of the weather. It is not merely a mechanical process of evaporation, as the amount given off is regulated by the plant itself. When too much vapour is being given off, the stomata begin to close, as if realising that the loss of great quantities of water means injury to the plant as a whole. So long as the supply of water from the roots exceeds that given off by the leaves, the latter remain plump and fresh, as the cells composing them are turgid or full of watery sap. But as soon as the leaves throw off more water than is supplied by the roots, the cells of the leaves gradually become emptied and collapse. As a consequence the entire leaf droops or, as gardeners say, it 'flags.'

In hot dry summers many thin-leaved plants may be seen to 'flag' during the day, although the roots may be well supplied with water, and only recover their freshness in the cool of the evening, when the transpiration current is not so great. This current of water from root to leaves continues as long as ever a particle of moisture remains near the roots. And it even continues for some time after plants and flowers have been severed from the roots and placed in water. This explains why in a cut state stems and flowers often last a long time fresh in water. If the base of the stems is cut from time to time, and under water if possible, the freshness may be extended for several days.

ARRANGEMENT OF LEAVES

Leaves are arranged upon the stem in definite order and may be *alternate*—that is, one after the other with only one leaf to each joint as shown in the Glossary, fig. 6; *opposite*, when there are two leaves to each joint, one on each side and opposite each other (Glossary, fig. 45); *whorled* or *verticillate*, when more than two leaves spring from a joint and form a circle (Glossary, fig. 116). In the case of Pine-trees it looks as if several leaves sprang from one joint, but such is really not the case: they are single leaves on a branch the joints of which are very close together.

The blade of a leaf may be in one piece, when it is called *simple*, as shown in the Glossary, figs. 4, 8, 10 &c.; or cut up into separate leaflets, when it is *compound*, as in figs. 17, 19, and 50 in the Glossary. Simple leaves assume roundish, elliptic, oval, or linear shapes with intermediate variations, and may be either sharp or blunt or slightly notched or pointed at the apex. The margins may be entire, wavy, serrate, toothed, lobed, or variously cut, and the base may be prolonged below the insertion of leaf-stalk, the lobes uniting and producing a peltate or shield-like form, as in the Indian Cress (Tropæolum) shown at fig. 79 in the Glossary. When the leaf-stalk (petiole) is absent the leaf is sessile, and when stipules are absent a leaf is said to be exstipulate. When the lobes of a sessile leaf are produced downwards to clasp the stem, leaves are said to be *amplexicaul*, as in fig. 8 of the Glossary; and if the lobes of opposite sessile leaves unite, they become *connate* as in fig. 33; or if single and surrounding the stem *perfoliate*, as in fig. 82.

Compound leaves may have the component parts called 'leaflets' radiating from the end of the stalk, as in the Horse Chestnut, when they are termed *palmate* or *digitate* (Glossary, fig. 50); or from opposite sides of the midrib like a feather, when they are *pinnate* (fig. 85). The leaflets of pinnate leaves may be divided once, twice, or more times. When the leaflets arise from one another on each side of the middle lobe, they are called *pedate*, as in the Christmas Rose (Helleborus). There is great variation, and as a rule two or more terms are employed to describe the shape of a leaf, but the main forms will be found illustrated in the Glossary, pp. 1–18.

THE FLOWER

The botanist regards the parts of a flower as so many leaves specially modified for certain purposes. An ordinary flower is composed of (i.) sepals (the calyx); (ii.) petals (the corolla); (iii.) stamens (andrœcium); (iv.) carpels or pistil (gynœcium). The sepals and petals are often absent altogether: sometimes one, sometimes another. As a rule they form the most conspicuous and showy part of the flower, and their natural duty is supposed to be to attract insects to search for honey and thus disturb the pollen and fertilise the pistils or carpels. The stamens and carpels are the essential parts of the flower, without which it is impossible to obtain seed. The stamens contain pollen in the little sacs or bags at the apex called anthers shown at fig. 9 in the Glossary. Insects are useful in brushing this pollen against the sticky top (the stigma) of the pistil. The pollen is sometimes ripe before the stigma, and *vice versa*, and it thus happens that flowers are not often fertilised with their own pollen. In this way the pistils in one flower may be fertilised with pollen from another, and if the species are different a 'hybrid' has been effected, or a 'cross' if the plants are of the same species. Seeds obtained from a plant thus crossed do not exactly reproduce the characters of the parents, although the differences may be very slight.

Sometimes the same flower contains both stamens and pistil, when it is said to be *hermaphrodite*. When a flower contains stamens only or pistils only on the same plant, it is said to be *monœcious*, as in the Cucumber (p. 1156), Marrow (p. 1155), Begonia (p. 462). But when male and female (or staminate and pistillate) flowers are borne on different plants, they are said to be *diœcious*, as in the Aucuba (p. 475) and Willow (p. 802). Very often flowers are without stamens and pistils, and are termed *neuter* or *sterile*, as in the cultivated forms of the Guelder Rose (p. 480) and the Hydrangea (p. 429).

Double Flowers.—Cultivation often plays havoc with the stamens and pistils. These become more or less suppressed, and (as showing them to be really modified leaves) they are replaced by petals, as in the garden Rose (p. 382), Carnation (p. 240), Hollyhock (p. 272), Double Begonia (p. 462) and Chrysanthemum (p. 531). The more the stamens and pistils become suppressed or modified by cultivation, the less chance is there of obtaining seeds from such flowers, and plants bearing them are with difficulty increased by seeds. Hence the adoption of other methods of propagation in such cases.

FERTILISATION AND HYBRIDISATION

Since the functions of the stamens and pistils have been better understood, gardeners have taken full advantage of them by transferring the pollen from the stamens of one flower to the pistils of another with a view to raising new races or 'strains' as they are called. When in a reciprocal state, fertilisation is usually effected, the pollen grows on the sticky surface of the pistil (called the stigma) and seeds are ultimately borne in the way described at p. 24. The plants raised from such seeds may combine the characters of both parents in a more or less even degree. When two species of the same genus are thus fertilised a 'hybrid' is the result. When two species belonging to different genera are fertilised, the product is called a 'bigeneric' hybrid. But when forms of the same species are fertilised with each other, they are simply called 'crosses,' and chiefly differ in the colour and size of the flower.

Of late years hybridisation has been carried on to an enormous extent among all classes of plants, and some very fine garden flowers have been thus obtained. It must be remembered, however, that only plants having a natural relationship to each other are likely to produce hybrids. The more distantly related they are, the less likely are they to be fertilised or produce seeds. As most of the plants described in this work are arranged according to their natural relationships to each other, it will be easy to see which are the most likely ones to use for hybridising purposes.

Unlike animals, it is a remarkable fact that most plant hybrids are capable of producing fertile seeds, and are as perfect in every detail as the species from which they were originally derived. Occasionally a hybrid is met with, which only with difficulty can be fertilised and made to produce seed. In such a case as with 'double'-flowered plants it must be increased by other means than seeds.

It may be appropriate to mention here that certain flowers, like Primroses (p. 617), Auriculas (p. 618), Oxalis (p. 292), Loosestrife (p. 451) &c. have the stamens and pistils alternately long in some flowers and short in others, and Darwin has pointed out that pollen from long stamens in one flower is naturally adapted for fertilising the long pistils in another; and the same with the short forms. Many flowers are fertilised by bees and various insects, but many others, like the Pine trees (p. 972), Willows (p. 802), Alders (p. 796), Poplars (p. 803), Birches (p. 793) &c., depend upon the wind to have their pollen blown about and transferred to the ovules (as in the Pines) or pistils (as in the others).

FORMS OF FLOWERS

Flowers are usually said to be 'regular' when their sepals and petals are similar as shown in figs. 24, 40, 54, 59, 63, and 66 in the Glossary; or 'irregular,' when one or more sepal or petal differs in size or shape from the others as shown in figs. 5, 22, 23, 58, 60, and 67. The petals may be quite free from each other, when they are called *polypetalous* (see p. 122), or may be united, when they are said to be *gamopetalous* (see p. 125). In the Glossary figs. 23, 24, 59, 63, 65, and 67 are examples of Gamopetalous flowers, while figs. 5, 40, 54, and 58 are examples of Polypetalous flowers. The stamens and pistils may also be either free or united. These characters are of great use for the purposes of classification, and are more systematically detailed at p. 120.

THE INFLORESCENCE

The way in which flowers are borne is termed the inflorescence. Flowers may be at the ends of the branches or in the axils of the leaves, and may have stalks (peduncles) branched or unbranched forming racemes, panicles, corymbs, umbels, or cymes &c.; all of which terms are explained and illustrated in the Glossary (p. 1). When without stalks they may form spikes, as in the Plantain, or heads, as in Clover, or catkins, as in the Birch. There are various modifications of these, as in the Arum Lily, where the flowers are in a fleshy spike (*spadix*) enveloped in a large and showy leaf called a *spathe*.

THE FRUIT

In popular language the term 'Fruit' is very vaguely used. Strictly speaking, the ripened carpels, whether hard or soft, constitute the fruit, or, in other words, the seed vessel or ovary. All flowering plants which produce seeds enclosed in an ovary are termed *Angiosperms* (see p. 121) and include both Dicotyledons and Monocotyledons.

The Pine trees and Cycads have their seeds quite naked on scales, and are termed *Gymnosperms* (p. 122).

Development of the Fruit.—Soon after the stigma of a carpel has been fertilised it withers, and the ovary begins to enlarge, the ovules which it contained now developing into seeds as the result of fertilisation. Sometimes an ovary (or fruit) contains only one seed, sometimes many, and there may be many ovaries in one flower, as in the Strawberry (p. 1089), Raspberry (p. 1085) &c., each containing only one seed; or there may be few ovaries or only one, each containing several seeds. In any case the ovary consists of one or more carpels either separate and distinct, or united.

When ripe, some fruits open naturally and shed their seeds, and are said to be *dehiscent*; others never open, and the seeds are only liberated by the rotting of the ovary walls. Such fruits are called *indehiscent*. As many kinds of fruits are mentioned in the pages of this work it may be as well to briefly define those best known.

SOFT OR FLESHY FRUITS

The *Berry* is a fruit which is soft throughout, the seeds being imbedded in a pulp, as in the Gooseberry (see Glossary, fig. 14), Currant, Grape, Tomato, and Orange (the latter having a leathery rind). The *Pepo* or *Gourd* is a hard-skinned berry, such as the Cucumber, Marrow, Melon.

The *Pome* is a fleshy fruit like the berry, but the calyx is the thickened edible portion in which is imbedded the cartilaginous ovary known as the 'core' in Apples, Pears, and Quinces (see Glossary, fig. 88).

The *Drupe* is the name of the fruit of Cherries, Peaches, Plums, Almonds and Nectarines. The outer layer, often merely the skin, is called the *epicarp*; the middle layer or flesh the *mesocarp*; the inner layer or 'stone' the *endocarp* (see Glossary, fig. 52)

In the Blackberry and Raspberry the fruit consists of a collection of small drupes and is called an *etærio*. The fruit of the Mulberry, like that of the Blackberry in appearance, is the product not of one flower but of several crowded on a short stalk.

HARD OR DRY FRUITS

The *Achene* is a small dry indehiscent one-seeded fruit, well seen in Buttercups and Strawberries. In the latter they are popularly regarded as 'seeds.' The juicy edible pulp is in reality the swollen top or receptacle of the flower stalk (see Glossary, fig. 1).

The *Pod* or *Legume*, familiar in the Pea, Bean, Scarlet Runner &c., is a fruit splitting into two valves, bearing the seeds on the edges (see Glossary, fig. 69). A *Lomentum* is a pod constricted between the seed breaking transversely into distinct joints.

A *Samara* or *Key Fruit*, like that of the Elm, Ash, or Maple, is an indehiscent fruit furnished with wings (Glossary, fig. 97).

A *Follicle*, as seen in the Pæony, Larkspur &c., is a simple carpel opening on one side only (Glossary, fig. 57).

The *Capsule* is a dehiscent fruit composed of more than one carpel usually with many seeds (Glossary, figs. 26, 27).

The *Silique* and *Silicle* are the long and short pods respectively of the Crucifer order (p. 201) (Glossary, figs. 99, 100).

The *Cone* is the peculiar multiple fruit of the Pine-tree family (p. 972). The cones consist of flat scales overlapping each other, and bearing the seeds at the base (Glossary, fig. 106).

The *Cremocarp* is the name of the fruit of the Umbellifer family (p. 464). It consists of two achenes which split apart when ripe (Glossary, fig. 38).

A *Nut* is a dry indehiscent fruit usually with one seed surrounded by a bony wall, as the Hazel or Cobnut (p. 797). In the Oak, the nut or acorn is fixed in a cup called the *cupule*, the whole fruit being called a *Glans* (Glossary, fig. 61).

INFLUENCE OF LIGHT ON VEGETATION

All plants having green leaves or stems can only properly develop and perform the function of assimilation or digestion by the aid of sunlight. Mushrooms (see p. 1166) and other Fungi carry out their functions with and without the aid of light. Some plants like as much sunlight as possible; others only a little, preferring a diffused light or deep shade; and others again seem to thrive better under intermediate conditions, some leaning towards light rather than shade.

Light is essential in any case to secure the formation of *chlorophyll*, the name given to the green pigment found in the cells of leaves. But this substance also requires a suitable temperature, and will not develop in very cold weather. The absence of chlorophyll is noticeable by the pale or yellowish appearance of the plants.

Sometimes gardeners are not anxious that it should develop at all; hence the reason of blanching Celery (see p. 1130), Seakale (p. 1121) &c. by covering the leaf-stalks over with soil, pots, boxes &c. The exclusion of light prevents the formation of the green colouring matter, and the stems are in consequence more palatable when eaten.

In the absence of light the leaves will not absorb carbonic acid gas, which is essential to the welfare of the plant. The latter must therefore live on whatever reserve material it has stored away in the stems or roots.

All observant gardeners know the difference between plants grown in light and plants grown in darkness or deep shade. Those under the latter conditions grow rapidly, and plants that are naturally sturdy will assume a weakly, more or less climbing habit, being anxious to reach the sunlight. And every cottager knows that the leaves and shoots of the 'Geranium' in his window always turn towards the glass and not towards the centre of the room.

On the other hand plants grown in plenty of light do not develop so rapidly, but each part performs its own function properly and steadily, with the result that the plants are more sturdy, and the stems and shoots become better matured and produce better flowers and fruits.

Light may therefore be said to have a dwarfing and ripening effect upon plants, while darkness has an elongating and weakening effect.

Apart from this may be mentioned the fact that the leaves of many plants of the Leguminous order (p. 322), such as the well-known Sensitive Plant, go to 'sleep'—that is, droop—during the night time, and only regain their spreading position in daylight.

From a cultural point of view, therefore, it is important to notice the effect of light, shade and darkness in plants. Very often a plant which has been grown in strong sunlight will not thrive under the best of treatment; but when it is shaded or partially shaded, it soon begins to show that it appreciates the altered conditions by the way in which it puts forth new growths. At p. 88 a selection of plants is given which will flourish in shaded or partially shaded situations, while many others are mentioned in various parts of the work.

PROPAGATION OF PLANTS

Propagation is the term applied to any method by means of which plants are increased or multiplied in number. Some plants can only be increased in one way, others in several; but as a rule the gardener usually and not unnaturally selects the method which gives him the quickest and what he considers also to be the best results. In the case of annuals and most biennials (see p. 78) he has no other choice as a rule but to raise them from seeds. This is also Nature's method of increasing most plants, but the process is often too slow to be regarded with satisfaction by the gardener. He therefore also has recourse to the other methods of propagation described below.

1. Propagation by Seeds

As just stated above, most plants growing in a natural state are increased by seeds. From a garden point of view, however, it is not always advisable to adopt this means, although many hundreds of plants may be very easily raised thereby. When it is desired to keep any particular plant true to its variety—that is, so that the progeny may faithfully reproduce all the features of the parent, in regard to habit, foliage, flowers, colour, fruit, flavour &c.—it is not wise to increase or propagate such a plant by means of seeds. For this reason : that pollen from the flowers of an inferior, or at least undesirable, variety may have fertilised the pistils in the flowers of the plant which it is desired to propagate. The characters of the original variety would in this way be tampered with, and the seedlings, although very similar to it, may have inherited some of the undesirable qualities of the strange parent, and lost the most desirable ones of the other.

It is therefore almost impossible for any seed to reproduce all the characters and qualities of its mother parent with absolute fidelity. Where little or no importance is attached to this fact, seeds will be found one of the readiest methods by which large numbers of plants may be produced. Plants raised from seed offer immense variety, and where novelties are required either as hybrids or crosses (see p. 37) it is a most interesting occupation raising them from seeds.

SEED SOWING

The best time for sowing seed is either in the autumn when thoroughly ripe, or in spring, when the earth's natural heat is favourable to germination. In a state of nature, as soon as seeds are ripe they fall to the ground and perhaps remain dormant during the winter, or else germinate sufficiently early to be strong enough to withstand the rigours of winter. All our annual weeds and a good many of our choice hardiest annuals if left alone would reproduce themselves in this way. And so would the hardy biennials and perennials, as witness the Evening Primrose, Horse Chestnut, Ash, Oak, &c. From a gardening point of view, however, it is found convenient to make spring the chief seed-sowing season, as there are so many other matters to attend to in the autumn. Other periods, when preferable for any particular plant, will be found noted in the following pages.

PREPARATION OF THE SOIL FOR SOWING SEEDS

Seeds are sown out of doors, either in beds, or in rows or 'drills' as they are often called. In whatever way they are sown the ground must first of all be specially prepared for their reception. It should as a rule be well dug or trenched some time previously, so that it will have had sufficient time to settle down afterwards. The surface must be made fine, and should be quite free from clods or lumps. As a rule seed beds are level, but they may under certain circumstances, where the soil, for instance, is naturally heavy and wet, be raised, with alleys about a foot wide between them, the better for thinning out, weeding &c. afterwards. Under south walls, the beds may be slightly inclined so as to catch more benefit from the sun's rays in early spring. The soil being thus warmed naturally excites growth, and the seedlings appear rather earlier than if sown under other conditions.

The necessity for a fine surface is obvious when it is remembered that the seeds of a vast number of plants are very small. If the soil were in a rough state and somewhat lumpy, the small seeds would sink down much too deep, and the young plants would probably never see the light of day; or if they did it would be in such a weak and exhausted state that they would recover only with very great difficulty.

The upper surface of the soil may be made fine in various ways. It may be sifted and afterwards levelled with a rake; or, if it is in a good friable condition, any lumps in it may be readily crushed with the spade or fork, before levelling properly with the rake.

The soil also may be trodden down well with the feet or a very light roller. This will secure evenness and consistency throughout, and will afford a much better run for the roots than if it is left very loose and powdery.

COVERING SEEDS

There is a vast range of variation in the size of seeds—some being like dust and scarcely discernible, while others, like the Pea, Bean, Horse Chestnut &c. are large enough to be handled quite easily. The well-known seed of the Coco-nut Palm is one of the largest seeds known, while those of our British and exotic Orchids are among the very smallest. Similar to these latter are the spores or 'seeds' of Ferns, while those of Rhododendrons, Azaleas, and many other plants of the Heath order (p. 574) are very little larger. Such a difference in size naturally suggests a difference in treatment in regard to covering seeds. The rough and ready principle usually adopted is to cover seeds with soil equalling their own depth or diameter, and for all practical purposes this is found to work very well. Minute seeds, like those of Rhododendron, therefore, are simply sown on the surface of the prepared soil, the fineness of which should as a rule correspond to the fineness of the seeds sown. Larger seeds may be covered with soil to a depth varying according to their size.

WATERING SEED-BEDS

Water is just as essential to growth as heat. Hence the soil in which seeds are sown must be in a more or less moist condition according to the nature of the plant. Some seeds require to be moderately moist, while others—such as those of marsh plants, a list of which is given at pp. 112, 113—require to be sown almost or quite in a wet muddy soil. In the case of the fine seeds already alluded to, where there is no covering of soil, great attention to watering is necessary for some time. Being not only minute, but also tender and likely to be shrivelled up by drought, the soil on which these tiny seeds rest should before sowing be thoroughly soaked with water. Afterwards they may be kept moist with a sprinkling from a very fine-rosed watering-pot, or the pots or pans in which they are sown may be stood half their depth in water. In this way the soil will absorb moisture upwards from the bottom, and thus avoid the necessity of watering with a can. Very often, when the latter is used carelessly or thoughtlessly for fine seeds, these are washed into a heap at one side, and thus are too dense to permit any good growth in the seedlings.

RECEPTACLES FOR SOWING SEEDS

It is often more convenient to sow seeds in greenhouses, hotbeds, or cold frames; or the quantity to be sown may be so small that it is not worth while sowing it in the open border. Under such circumstances flowerpots, pans, or shallow wooden boxes are generally used. Whatever receptacle is used it is first of all necessary to see that it is well drained before filling it up with soil.

‘CROCKING’ OR DRAINING POTS

In the case of flowerpots, these must be ‘crocked,’ as gardeners say. A flattish piece of broken pot, having about the same diameter as the bottom of the pot, is placed over the hole in the centre. Over this large ‘crock’ smaller ones are placed, sometimes as much as half way up or more, when particularly good drainage is required. Where large quantities of crocks are used, they should become gradually smaller towards the top. Over them all is placed a layer of moss, or fibre of some sort, such as that shaken out of peat, or turfy loam. This prevents the soil from being washed down among the crocks, and thus choking up the spaces between them required for the free passage of water and air.

NECESSITY OF DRAINAGE

Too much importance cannot be attached to the proper drainage of soil, whether it is held in a pot or box, or whether it is in the open garden. Unless the water can pass away from the soil readily, it becomes more or less stagnant in it, causes sourness, prevents the circulation of air, lowers the temperature round the roots, and generally interferes with the health of the plant. Under the chapter on soils the question of drainage is more fully treated (see p. 66). Whether boxes, pans, or other receptacles are used, the question of drainage must be first attended to as with flowerpots.

Having attended to the drainage, the soil, which must be of a nature suitable to the plants to be grown, may be placed over the moss and crocks, and pressed down more or less firmly with the fingers or a small piece of flat board, and brought to within half an inch of the top of the rim as a rule. Where very fine seeds, like those of Begonia, are to be sown the soil may be raised in the centre, forming a shallow dome, but in such cases the soil must be light and easily permeable by water.

HOW TO SOW SEED

As a general rule, it may be said that seeds of all kinds of plants are sown too thickly, with the natural consequence that the seedlings spring up very close to each other, and if they are not 'pricked out' or 'thinned out,' as described below, they soon stifle each other, and very few, if any, good plants are obtained.

Where the seeds are fairly large and easily handled there is no excuse for sowing them thickly. It may take a little longer time to sow them at more or less regular intervals, but the time spent then will be saved, and more than saved, later on when they have germinated. In the event of other work requiring attention, thinly sown seedlings may be allowed to stand longer in the seed-pots without injury than those which have come up too close to each other.

With tiny seeds it is very difficult to avoid sowing them thickly, and great care must be exercised in handling them. Some of them are so small and so light, that hundreds of them may be blown away and lost for ever by a slight puff of wind, or even a cough. Such seeds therefore should not be sown in a draughty place for this reason.

To avoid sowing them too thickly, it is a good plan to sift some dry sand through fine muslin or a hair sieve, and mix the seeds thoroughly with it. The sand and seeds may then be sown as thinly as possible over the surface, treating the grains of sand as if they were seeds—and the seedlings will as a rule not be so close together as if sown without this artificial aid.

The sowing of Fern spores has been dealt with separately at p. 1008.

THINNING OUT SEEDLINGS

This will be necessary when the seedlings are large enough to handle, so that those intended for bloom will have ample space to fully develop without having had their roots disturbed. Thinning out is best done in dull showery weather when the seeds have been sown in the open air. Failing this, the seed bed should be watered before or after the work.

PRICKING OUT SEEDLINGS

This operation is almost equivalent to thinning the seedlings and to transplantation. It consists in transferring the seedlings from pots, pans, or places in which they developed from the seed, to similar receptacles or places, only much further apart according to kind. The plants have thus more room and air and become sturdy. They also produce more fibrous roots, as the removal usually injures the first central main or tap root, and its place must be taken by new fibrous ones developed from the sides.

Many plants are improved in growth by pricking out or transplanting, but a few are injured by the process, and these are mentioned in their proper places. As a rule it is safer not to transplant or prick out any plants which are grown chiefly for the sake of their tap-roots, such as the Carrot (p. 1128), Parsnip (p. 1129), Turnip (p. 1119), Radish (p. 1120), Beet &c. (p. 1151). If transplanted very young they may develop fairly regular-shaped roots, but as a rule they do not, hence are usually thinned out in the seed beds instead of being transplanted.

Hotbeds

As hotbeds and cold frames are most useful for raising seeds and for many other purposes in the garden, they may be referred to here.

A hotbed when well made is an extremely useful adjunct to a garden, and especially a garden without greenhouses. It may be erected in some out of the way part where its presence is not too noticeable. By its aid all kinds of tender plants may be raised in early spring or protected in winter ; cuttings of bedding and other plants will quickly root on it, and many other uses may be found for it.

For making hotbeds the best stable manure should be used, together with plenty of leaves, those of the Oak or Chestnut for choice.

Stable manure by itself heats too quickly and dies out too rapidly. By adding leaves, heat is not generated so quickly but is more lasting and suitable for plants.

The whole should be well mixed and turned over (any dry portions being thoroughly wetted) every other day for about a week or so, to allow the rank steam to escape.

In making the hotbed, the litter and leaves should be placed evenly layer after layer, and in such a way as to be 6 to 12 inches longer and wider than the frame intended for it. As the bed proceeds it should be evenly and firmly trodden down, the better to secure a uniform heat. When finished and settled down the hotbed should be 3 to 4 feet high, sloping from the back to the front, and facing south. The surface may be covered with a layer of well-rotted manure, and upon this may be a covering of prepared soil or coco-nut fibre, varying in thickness according to particular requirements.

It is advisable to tilt the ends of the lights at first to allow the escape of rank steam. Shading may be done, if necessary, by mats, canvas, or whitening the glass.

When any plants described in this work require the assistance of a hotbed, the fact will be found mentioned.

Cold Frames

Besides hotbeds, cold frames are very convenient, more particularly for raising seeds of rather tender hardy plants, or for protecting perennial plants in winter that have been grown in the open air during the summer and autumn months. In very severe winters the frames may be banked round with litter, and covered with one or more layers of Russian mats if needed. In fine mild wintry weather the lights should be taken off or well propped up during the warmest portion of the day, when not frosty, and should be closed early enough to retain a fair proportion of sun heat for the night. Cold frames are of various sizes and makes to suit different kinds of plants ; but they are rather expensive. The amateur, however, can easily improvise a frame good enough for practical purposes. See page 100.

Labelling

After seeds of annuals, biennials, or indeed any plant, have been properly sown, it is important that each kind should be distinctly labelled. Wooden labels varying from 3 to 12 inches long may be used. The surface should be slightly and evenly covered with white paint (Continental growers like yellow) and written upon while still damp. With the sharpened end of the label pointing to the left, the generic name should be written above the specific. The date of sowing should also be recorded, and to prevent it becoming obliterated by being pushed too far into the soil, this is best done on a space ruled off by a line at the top of the label. Several labels may be ruled at once, and there is nothing lost by a little neatness and clearness in writing. When special seeds are sown, the name of the sender, country &c. are worth while recording. Where many kinds of seeds are sown, it will be interesting to note how much longer it takes some seeds to germinate than others under equal conditions.

In the Flower Border and Rock Garden it must be admitted that labels often look far from picturesque, especially when the plants they represent have disappeared perhaps for ever. In such cases they have not inaptly been termed tombstones, and should be removed when all hope of the plant beneath the surface is abandoned.

On the whole, however, a good case can be made out for labels in the flower garden, whether of wood or zinc, especially when many species are grown, unless one has an extraordinary memory. In the case of deciduous herbaceous plants labels mark the spot in winter and prevent the plant being accidentally uprooted and thrown away. The size of the label, however, should always be more or less in proportion to the size of the plant, as nothing looks more ridiculous than to see a tiny plant an inch or two high hidden behind a label a foot long and 2–3 in. broad.

2. Propagation by Cuttings

Perhaps there is no operation in which the amateur gardener takes so keen a delight as in increasing any choice plant in his stock by the readiest means, and sometimes by unusual means, for the sake of experiment. Apart from increasing plants by the natural method of sowing seed, that of making cuttings is most popular, and many amateurs whose enthusiasm knows no bounds endeavour to make a new plant out of every part of an old one, whether suitable or not. As a rule, these enthusiasts make the best gardeners, as every failure is a lesson, and the more failures they can reckon the greater the extent of their knowledge.

Cuttings consist of detached portions of a plant—either root, stem, or leaves—from which separate and distinct plants with roots of their own are obtained, and lead an independent existence. Although some plants are more difficult than others to raise from cuttings, it may be taken as a general principle that plants having buds, bark, and more or less pithy stems are capable of being increased by this means. This practically includes all the Dicotyledons except annuals (see p. 78) and excludes many Monocotyledons (p. 127) and Ferns (p. 1008). Plants are often increased by cuttings simply because there is no other way—but chiefly because seeds will not ripen or cannot be procured. Special varieties are also increased by cuttings, as, if raised from seeds, the distinguishing characters may be lost or blended with those of another variety, as already explained at p. 42.

Selecting Cuttings.—Cuttings should always be selected from healthy plants and the best varieties. When herbaceous, they are taken from the young plump shoots. A few of the lower leaves are stripped off, and the stem is cut away to a joint. Herbaceous cuttings may be put in whenever they can be obtained, but spring and autumn are perhaps the best seasons. If cuttings of choice plants are placed in a little heat, as on a hotbed (p. 46), and kept shaded for a few days, they root or 'strike' much more quickly than if left unprotected in the open air. But cuttings of a vast number of herbaceous plants and of trees and shrubs root easily in a shady border or in a cold frame.

Until a cutting makes roots of its own, it must continue to live somehow. It is well known that plants *with* roots will suffer from want of water, and that very hot sunshine will often cause the leaves to wither even when the roots are well supplied with water. How, therefore, is a piece of a plant which cannot absorb water, as it has no roots, and cannot prevent the evaporation of the moisture already in it, going to exist for any length of time, and not only exist, but produce roots and eventually develop into a large plant from which several other cuttings may be taken? It is well known that portions of plants placed in water often keep fresh and healthy for a long time, especially if kept shaded from bright sun. This fact is taken advantage of in regard to cuttings. They are usually placed in damp, sandy soil, and are kept shaded from the sun. Air is also excluded for a time. In this way evaporation is checked, the cuttings retain a good deal of their plumpness, and the cells of the cut surface when cleanly cut with a sharp knife have the power of taking up and transmitting from one to another a certain quantity of water.

The roots have still to be formed, otherwise the cuttings die, as they cannot live indefinitely in a rootless condition. In making cuttings they are usually cut clean across just beneath a joint with a sharp knife. The reason for this is that at every joint is one bud or more, usually in a dormant condition. These buds become plumper and plumper on the plant until they burst into leaf or flower. They evidently have the power of attracting or drawing to themselves, therefore, a greater amount of nourishment than the part of the stem between the joints. When a cutting is severed just beneath this seat or storehouse of nourishment, the injured cells of the cut surface endeavour to heal their wounds and keep alive by drawing away some of this nourishment. When this takes place a cushion or ring is formed round the cut surface, and protects the inner cells from further injury. From this ring or cushion, which gardeners call the 'callus,' roots are soon developed—they are drawn out as it were by the moisture of the soil, and at once begin to absorb food in a soluble state at their tender tips. Once this stage has been reached a change is seen above the soil in the cutting. The young bud at the tip is no longer inactive, but begins to grow and put forth leaves, and these also begin to work in conjunction with the roots, and thus add to the size and weight of what is now an independent plant. Henceforth it must be treated like its parent and get the benefit of light, air, moisture and heat in the same way, according to its requirements.

A large number of plants may be obtained from cuttings, but there are also a vast number which cannot be increased in this way, such as 'annuals' for example. The same may be said of most biennials, that is, plants which take two years to fully mature before dying down. To these may be added such plants as Grasses, Bamboos, Palms, and many other plants like them having leaves with parallel or curved veins, and no rind or bark, as in the Willow, Apple, Pear, Plum &c.

Cuttings may be divided into two main groups—soft-wooded or herbaceous, and woody. In the Zonal Pelargonium, for instance, not only will the ends of the branches 'strike' or produce roots but almost every joint, always provided the stems are not too sappy. And here it may be as well to mention as a general rule that all cuttings should be taken from fairly well-ripened and firm parts of the plants. Cuttings of stems too young and watery are apt to rot very soon, and those from very old and dried wood do not root, chiefly because there are no young cells full of life left. Cuttings of most herbaceous plants and of many trees and shrubs all require pretty much the same treatment. They should be inserted in sandy soil, a hole having first been made with a blunt-pointed dibber about twice as thick as an ordinary lead-pencil. The soil should be pressed firmly but gently round the base so as not to crush the tissues, but at the same time firmly enough to prevent the cuttings coming out readily when gently pulled with the finger and thumb.

Pots, pans, shallow boxes, or any other receptacle may be used for putting the cuttings in, but whatever receptacle is used it should always be well drained as explained under 'Seed Sowing,' p. 43. No particular heat is required for the plants mentioned, but in others which do not come within the scope of this work a very high temperature is necessary both above and below to make them throw out roots.

Cuttings of woody plants differ a good deal from those of soft-wooded or herbaceous plants. In them we have a quite different kind of cutting. The most notable thing is the absence of leaves, but dormant buds are shown at the joints where the leaves have fallen away. There are a large number of plants which are easily increased by cuttings of this kind. When the leaves have fallen off naturally in the autumn, the thoroughly ripened stems may be cut into various lengths and put into the soil, allowing them to remain during the winter. In spring the dormant buds will burst into leaf, and in the course of the summer new branches will be developed. All this is a sign that work is being done under the surface of the soil. Beneath the hard woody bark is a layer of green tissue, with a mass of green young cells full of the active growing material called protoplasm. During the winter the temperature has been too low to start the living matter in the cells into growth, and so they remain idle or dormant. But when the temperature reaches a certain point in the spring it happens to be just suitable for the protoplasm, and the contents of every cell in consequence become active. A 'callus' is formed at the cut end of the stem in the soil, and by-and-by young roots are developed exactly as in the soft-wooded cuttings, and the process of taking up nourishment from the soil begins in earnest. A large number of trees and shrubs, with net-veined leaves, can be increased in this way, among them being the Virginian Creeper, and its relation, the Ampelopsis Veitchi, which clings to walls, the Willow, Gooseberry, Currant, Mock Orange, Rose, Apple, Pear, Plum, Cherry &c. Of all these it is better to have a shoot about eight or nine inches long, so that about half of it may be inserted in the soil, although cuttings of many others need be only 2–3 in. long.

Root Cuttings.—Tops of branches and portions of the stems are the usual parts of a plant used for making cuttings. But there are other parts which are equally useful for the same purpose. The root, for instance, of some plants like the Japanese Windflower (Anemone japonica) and the Japanese Quince (Cydonia japonica), Sea Kale, the Rose, and many others, if cut into pieces a couple of inches long, and 'sown' in the soil as if they were seeds, will produce young plants. As a rule root cuttings are usually best put in a little heat. Only those plants the roots of which have a tendency to develop buds are increased in this way. A distinction must be made between these roots and underground stems.

Leaf Cuttings are employed in the case of plants in the Crassula order, and tender plants like Begonias and Gloxinias. The leaves are placed on fine sandy soil or coco-nut fibre, and the main nerves are cut through with a sharp knife. The sap from the cut surface forms a callus, and from this comes a little bud above and roots below. After a time the body of the leaves decays, leaving the plantlets, which are potted up singly into small pots, in fine rich sandy soil.

Preparing Soil for Cuttings.—The soil for cuttings should always be specially prepared, particularly for those of flowering plants. Whatever soil the plant grows in best should be used, with more than the usual mixture of sand; and it should always be well drained, as stagnant moisture would very soon rot the rootless stem. The more tender or difficult the plant, the more care should be taken in watering, shading, and airing the cuttings.

3. Propagation by Grafting

A graft is somewhat like a cutting, but instead of its being placed to root in the soil it is inserted in the stem of another living plant which is already provided with roots. Only trees and shrubs and sometimes herbaceous plants of the Dicotyledonous group can be grafted. The cut surface of the graft or 'scion' and the stock should fit neatly together, in such a way that the layer of the inner bark in each should be in contact. This layer is called the 'cambium,' and consists of thin-walled cells, which are always at work adding a layer of wood on the inside and a layer of bark on the outside, thus adding to the diameter of the plant stem, as already explained at p. 30.

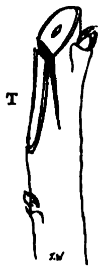

FIG. 117.—WHIP GRAFTING.

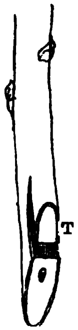

FIG. 118.—WHIP GRAFTING.

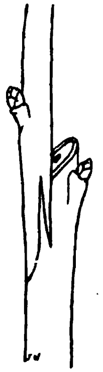

FIG. 119.—WHIP GRAFTING.

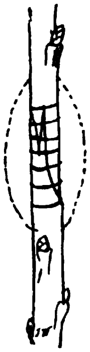

FIG. 120.—WHIP GRAFTING.

Varieties of Grafting.—There are various ways in which a graft is attached to the stock, the chief being :—

(*a*) *Whip Grafting.*—This is most generally practised. It consists in making an oblique cut in both stock and scion in such a way that they will fit exactly as shown in figs. 117 and 118. A tongue (T) is also cut in each so as to fit one into the other. Where there is a difference in size the scion must be inserted nearer one edge to secure the meeting of the inner bark. When neatly fitted, as in fig. 119, the whole should be bound with woollen thread or raffia so as to keep the scion from moving about, and clay or grafting wax should be at once plastered all round to exclude the air and prevent drying. Fig. 120 shows a completed graft tied up, the dotted lines representing the clay or grafting wax around the joined portions.

(*b*) *Cleft Grafting.*—This method consists in splitting or cleaving the head of the stock open by a chisel or small chopper. The end of the scion is cut wedge-shaped and inserted in the cleft so as to make the inner edges of the bark meet. This may also be called Market-garden Grafting, as it is usually employed in furnishing the tops of old, worn-out fruit trees. The objection to it is that in splitting the stock, perhaps in three or four places, a much larger space than is required for the scion is made, and may take a long time to heal, if it ever does. There are variations of this method.

(*c*) *Saddle Grafting.*—In this method the stock and scion must be of equal thickness. The stock, as shown in fig. 121 A, is cut upwards on two opposite sides to make a wedge. The scion, as shown in fig. 121 B, is split up the centre and hollowed so as to fit on top of the stock. The reverse method, of inserting a wedge-ended scion into the stock, is called *Wedge Grafting.*

(*d*) *Crown or Rind Grafting.*—This system is generally practised in spring, when the bark easily separates from the wood. The scion is cut obliquely, but a square shoulder is made at the base by a transverse cut. It is pushed in between the bark and wood of the stock until the shoulder rests on the top of the stock. Several slender grafts may be inserted by this means round the edge of a large trunk, as shown in fig. 122.

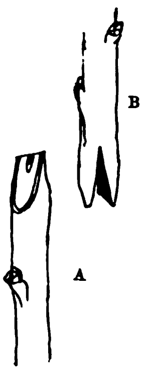

FIG. 121.—SADDLE GRAFTING.

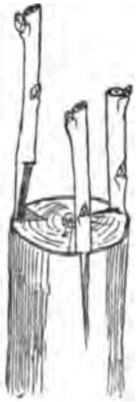

FIG. 122.—CROWN GRAFTING.

An improved method of Grafting is shown in figs. 123, 124, and 125. It is not exactly new, as something similar was practised about ninety years ago; but specimens from which the drawings were made were exhibited a few years ago in London to show the difference between the ordinary system of grafting and the improved one. Fig. 123 shows a graft inserted in a much thicker stock. The rind or bark, however, is not cut away from the graft, but is carried over the head of the stock, and is inserted under the bark on the opposite side. This is the only difference in the two operations, the tying up and waxing or claying being done as usual. The result of the union is shown, however, in fig. 124. This shows that a cushion of tissue and bark has formed over the head of the stock, and has thus protected it from decay owing to possible moisture, fungoid diseases &c. In fig. 125 the result of inserting a graft in the ordinary way is shown. The union is perfect enough, but the central cylinder of wood in the stock has not been covered over by the bark, and is thus left exposed to the weather, and may sooner or later decay. This, of course, means danger to the graft, although it may not take place for several years.

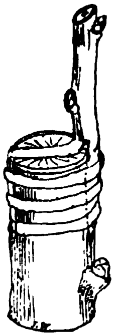
FIG. 123.

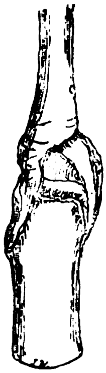
FIG. 124.

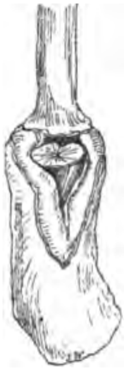
FIG. 125.

(*e*) *Side Grafting* consists in inserting a graft sideways into the branch or trunk of a tree chiefly to fill up a vacant space. The scion may have either shooting buds on last year's growth and be inserted in April, or may have dormant buds on the current year's wood and be inserted about August or September, to develop the following year. The practise of inserting dormant fruit-buds has been tried in France and England, and the advocates of it claim that magnificent fruit has been obtained thereby. (See figs. 130, 131, p. 59.)

(*f*) *Veneer Grafting* is practised in spring or autumn, preferably the former, chiefly with evergreen trees and shrubs. The corresponding sides of the stock and graft are cut obliquely about 1 in. long, fitted together, tied, and placed in a close frame. The leaves of the scion are not stripped off at the top, and the top of the stock need not be cut off till after the union has taken place.

(*g*) *Grafting by Approach or Inarching.*—This is rarely practised except on Vines. It consists in bringing the stems of two plants together, cutting away a portion of the bark of each, fitting the cut surfaces together and tying. Here both stock and scion have roots, but the scion is not severed from its parent until it has been completely united to the foreign stock.

(*h*) *Root Grafting.*—Many plants are grafted on roots of their own or an allied species, chiefly when the sap begins to flow in spring. Unless carefully performed the union will be imperfect and the plants useless after a time. Clematises were and still are grafted in this way, but sooner or later they nearly all die unless the operation is neatly performed, and it is therefore better to obtain plants from cuttings or seeds.

Whichever kind of Grafting is practised, the main point to remember is that the cambium-layers—seated just between the inner bark and the young wood—of both the stock and scion must come in contact with each other. It is useless placing the hard wood of the one against that of the other, as the cells in that portion have long ceased to be in a living state. The cells of the cambium-layer in the stock unite with those in the cambium-layer of the scion, the contents as it were intermix or fuse together by the reciprocal action of the protoplasm (see p. 22), and a union between the two is effected. As plants of the Monocotyledonous group have no cambium-layer it naturally follows that they cannot be grafted; but nothwithstanding this, numerous attempts have been made, and all have failed.

Selecting the Grafts or Scions.—In selecting a branch for grafting due consideration must be given not only to the relationship existing between stock and scion referred to in the preceding paragraph, but care should be taken to select well-ripened shoots of the previous year containing several buds. Attention should also be given to the buds to see that they are leaf-buds and not flower-buds. The main object in grafting being first of all to produce branches, it is obvious that this may be effected more readily by means of shoots having leaf-buds instead of flower-buds. In the various fruit trees described in this work the difference between the wood or leaf-buds and the flower-buds is shown in the illustrations, so that readers may not mistake one for the other.

When grafting is practised only scions of really choice and fruitful varieties should be selected. The scions should be 6–8 in. long, and are best taken from the side shoots rather than those of the uppermost and strongest growing branches. It is not essential to unite a scion to the stock immediately it is detached from the tree. Indeed, a few days are allowed to elapse so that movement of the sap shall become slower in the scion than the stock. The shoots, however, must not be allowed to dry or shrivel up, but may be placed in the soil in a shady place. If they are to be sent away any distance it is a good plan to stick the ends into a Potato tuber or moist clay, or to pack them in damp moss. When, however, the scion is about to be inserted in the stock the end should always be cut so as to have a fresh surface.

Time to graft.—Except where otherwise mentioned grafting is usually performed about March. About this time the sap is beginning to rise from the action of the roots, and the bark is more readily opened. The process of uniting also goes on slowly at first and becomes more rapid with the flow of the sap. The shooting of the buds on the scion usually indicates that union has taken place, and the ties should be looked at frequently afterwards, and loosened later on if necessary.

Relationship of Stock and Graft.—It is important to remember that plants cannot be promiscuously grafted one on another. They must at least belong to the same Natural Order, and should as a rule be closely related. As all the plants described in this work are arranged according to their close relationship with one another it will be easy to avoid making mistakes in grafting one species on to another with which it has no near affinity. It is improbable, for example, that a Barberry (p. 178) could be successfully grafted on an Apple tree (p. 1042), and *vice versâ*. At the same time such practices cannot be prevented, and if they *should* succeed it would indeed be a wonderful thing.

Exclusion of Air.—This is another essential point to remember when grafting. If the air is allowed to circulate around the cut surfaces the latter are soon dried up, a film is formed over them, and an effective barrier is thus placed between the cells of the two cambium-layers. Various composts are used to exclude the air, but those referred to below are perhaps the best and most generally useful.

Grafting Clay and Wax.—This is made of clay well worked up with a little chopped hay and horse or cow manure. If a hole is made in the centre of the heap, water poured in will keep it moist for a long time. It is an easy way of obtaining a good material for placing round grafts. In France a mixture of 28 parts black pitch, 28 Burgundy pitch, 16 yellow wax, 14 tallow, and 14 sifted ashes, is generally used instead of clay.

Three parts each of resin and bees-wax and two parts of tallow also make a good wax, which can be used lukewarm for grafts of small or delicate plants. The wax known as 'Mastic l'homme Lefort' is a clean preparation sold in tin boxes. It may be applied cold and is called 'French Cold Grafting Wax.' Although soft, it hardens with exposure to the air.

ADVANTAGES OF GRAFTING

Some authorities condemn grafting altogether on the ground that the plants sooner or later lose their vitality and become little better than scarecrows. Where the operation has been unskilfully performed this is undoubtedly the case, but there are hundreds, if not thousands, of examples of grafted trees in the rudest vigour throughout the country. It seems as if the constitution of a plant goes a long way towards proving whether grafting is a success or a failure, and it is scarcely advisable to argue general principles from isolated examples on one side or the other.

It is claimed for grafting

(i.) That it increases and accelerates the fruitfulness in fruit trees owing to the check of the elaborated sap at the junction of the stock and scion in its downward course.

(ii.) That old and unfruitful trees with strong and healthy stems and roots may be rendered fruitful in two or three years by having scions of fruitful and healthy trees grafted on their tops.

(iii.) That naturally tall-growing varieties may be dwarfed by grafting on a less vigorous stock, and the reverse may also be attained. When there is too great a disparity between the stock and scion, the device of *double* or *treble* grafting is often adopted, so as to equalise matters as much as possible. That is, one or two kinds intermediate in vigour may be grafted on the stock before the required scion is ultimately grafted on to one of them.

(iv.) That a naturally deep-rooting tree, like the Pear, may be prevented from sending its roots down into cold and uncongenial soil by grafting it on a naturally shallow-rooting stock, like the Quince; and

(v.) That by means of grafting, choice varieties of fruit, the innate qualities of which cannot with any certainty be transmitted to their progeny by seeds, are preserved and multiplied with greater certainty and quickness,

> 'And in short space the laden boughs arise,
> With happy fruit advancing to the skies.
> The mother plant admires the leaves unknown
> Of alien trees, and apples not her own.'

Influence of Stock on Scion.—It is curious that notwithstanding the growth of one species on another, and the influence exerted in regard to fertility &c., yet each kind undergoes no change in its botanical structure. A Quince stock will produce Quince suckers, and the Pear grafted on it will produce only the leaves, flowers, and fruits of the Pear. In the same way, a Peach grafted on an Almond or a Plum will remain a Peach. While it is true generally that neither stock nor scion is affected by the other structurally, there is one remarkable exception afforded by *Laburnum Adami*, known as a graft-hybrid, and described at p. 327.

4. Propagation by Budding

The process of propagation by budding consists in detaching a ripened bud from one plant and inserting it beneath the bark in the stem of another closely related. It is confined almost entirely to woody Dicotyledons, for the same reasons as Grafting, viz. because they have a cambium-layer (see p. 30), and is usually performed about the end of May or June to the end of July, when the sap is in rapid circulation, and the bark readily separates from the wood. Almost all Roses, Stone-fruit Trees, as well as many ornamental trees, like Maples &c., are budded, and the practice is now being extended to many other trees and shrubs.

Budding may be done in various ways, but the method usually practised is known as shield or T-budding.

The bark of the stock should have a cut made lengthways and crossways like the letter T as shown in the sketch fig. 126. A bud is then carefully selected (in most cases care should be taken to select a leaf-bud, not a flower-bud) by passing the knife behind the bud so as to secure a piece of bark or a 'shield' about ½ inch long above and below it as shown in fig. 127, but without any wood behind. By allowing a leaf-stalk to remain beneath the bud, a handle is supplied, which enables one to easily insert the bud between the lips of the T-cut in the bark when gently pressed open by the thin bone handle of the budding-knife. The bud must then be carefully and firmly—but not tightly—tied with woollen thread or soft matting, gently bringing the edges of the cut together. In a month or so the bud will have begun to swell, and the thread or matting if not already burst or

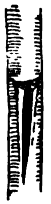
FIG. 126.

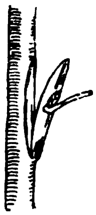
FIG. 127.

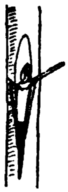
FIG. 128.

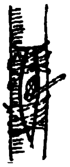
FIG. 129.

decayed should be loosened or removed altogether. Fig. 128 shows the bud inserted halfway in the slit, and fig. 129 shows it completely inserted and securely tied.

About November the budded shoot will have grown a good deal, and should be cut back to within 5 or 6 inches of the insertion of the bud; in the following March or April the shoot may be still further shortened back close to the bud itself before growth commences.

Where much budding is done, care must be taken to keep the buds from being dried up by the sun and air. A good plan is to have them in a jar or water-pot with some wet moss to keep them fresh.

Budding is often performed later in the season than August, with the object of keeping the bud from shooting until the following spring. It is also done in spring just at the beginning of growth, but the same principles underlie the operation no matter when performed. Sometimes a dormant fruit-bud as shown in figs. 130, 131 is inserted in autumn, and is said to produce larger and finer fruits than the other fruit-buds.

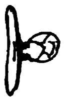

FIG. 130.

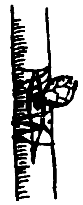

FIG. 131.

5. Propagation by Layering

This operation is extensively practised to increase trees and shrubs, and perennial herbaceous plants which cannot be so readily propagated by other means. It consists in bending down to the soil a branch and fixing it by a peg (as shown in figs. 132 and 133), and covering it with a mound of earth (represented by the dotted lines) until such a time as it has developed roots of its own, the layer in the meantime being fed by the parent plant.

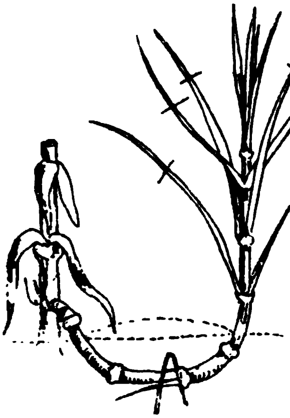

FIG. 132.—LAYERING HERBACEOUS STEMS.

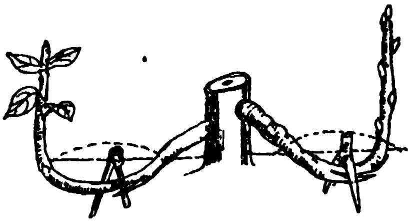

FIG. 133.—LAYERING WOODY STEMS.

Very often the branch layered is cut halfway through lengthwise at the part to be placed in the soil, and a tongue or heel is formed, as shown near the pegs in the illustrations. The cut is kept open by the soil, a small peg, or a pebble, and this induces a callus to form and roots to develop more quickly. Where the branches to be layered are near the ground, as in Carnations, Strawberries &c. there is little difficulty in performing the operation. Occasionally, however, branches of trees a few feet above the ground have to be layered. They must be carefully bent down, firmly pegged at the point of contact, and covered with soil. As a rule when the branches are fleshy or woody they may be notched or slit, but they are also simply twisted so as to bring the cells closer together at the twist, and thus arrest the downward course of the elaborated sap.

Principle of Layering.—Layering is practised on the principle that any injury which prevents or checks the return of the elaborated sap down the stem greatly facilitates the production of roots. This check is brought about by slitting the stem, removing a portion of the bark, notching &c. on the under side. As in a cutting, a 'callus' is formed on the cut surface by the returning sap, and roots are eventually developed.

Sometimes, instead of making an incision in the stems, a ligature of some kind, say wire, is bound round it tightly. This checks the return of the sap, and the stem above the ligature increases in size. If placed in the soil roots will be emitted, but if exposed to the air the effect in the case of fruit trees is generally seen in much larger and finer fruits.

6. Propagation by dividing the Rootstock

In the case of hardy herbaceous perennials (*i.e.* plants which live for several years, but the stems of which die down annually) dividing the roots in autumn or spring is found to be an easy means of propagation. The more carefully the work is done, the less injury is caused, and the sooner the plants recover. Chopping up with a spade in the case of Phloxes, Perennial Sunflowers, Larkspurs &c. is not to be recommended, as too much needless damage is caused thereby. Wherever shoots spring from the base or around the old rootstock they may be carefully detached either with the fingers or a sharp knife, and if inserted in good soil and kept shaded for a time, will produce good plants.

7. Propagation by Suckers

Many plants throw up from the root numerous leafy branches called suckers. It is often found useful to detach these carefully by means of a sharp knife or other instrument with as much root as possible attached. By transplanting to a shady place, they soon recover and are then practically established plants leading an independent life.

THE SOIL, ITS NATURE AND COMPOSITION

SOIL is the term applied to the upper crust of the earth's surface which has been ground and powdered into a more or less fine state by the action of man and the weather. It consists of particles of various kinds of rock mixed with decayed or decaying animal and vegetable matters. Beneath the soil in which the roots of plants grow is what is termed the subsoil. This may be a bed of clay, sand, limestone, gravel &c., and is generally not in a condition to supply the roots of plants with the food they require until it has been tilled and mixed with the surface soil.

Soil absorbs and radiates heat and moisture and is gradually being broken up into smaller fragments by the action of heat, cold, moisture, and the gases of the air. Frost plays an important part in breaking down particles of rock and converting them into soil. The frozen water (ice) pushes the particles asunder and with the increase of temperature they fall apart. The absorption of heat by day and its radiation by night also reduce the soil to a finer condition. And the roots of plants themselves have the power of breaking up particles of rock, and even of dissolving by their action mineral substances not readily soluble in water. In fact a change is always going on in the soil, and the gardener simply hastens the process by his operations. It is as well, however, that he should always bear in mind that it is the upper layer of the earth's surface, and not that two, three, or more feet below it, that is likely to contain available food for the plants he grows. And although the under layers constituting the sub-soil may be broken up when occasion requires or opportunity permits, they should never be brought to the surface as a medium for the roots of plants to grow in.

Kinds of Soil.—Soils for gardening purposes are usually spoken of as sandy, clayey, loamy, peaty, chalky, and gravelly. A mixture of these is on the whole better than any one of them by itself; although for certain plants it may be better if one or other sometimes predominates.

Sandy and Gravelly Soils are of little value by themselves, but may be improved by the addition of clay, vegetable matter or humus and lime or chalk. By this means a loose gravelly soil is rendered more adhesive, and the roots are enabled to perform their functions without being torn about by the wind.

Clayey Soils are too sticky and retentive of water to be of any use to plants. They require to be broken up and mixed with sand, ashes, lime, humus, &c., until they are rendered sufficiently porous and at the same time capable of retaining moisture in the particles.

Loam is a well-balanced mixture of clay, sand, and humus, and is termed 'sandy' or 'clayey' according as one or the other predominates. For garden purposes a loamy soil is best, as it can be most readily cultivated to suit the majority of plants.

Chalky or Limestone Soils are those in which chalk or limestone is present in appreciable proportion, say over 20 per cent. The presence of lime may be detected by adding vinegar or any other weak acid to the soil. If the lime is present in any great quantity it will cause a froth, owing to the carbonic acid being released. Wet chalky soils are as bad as clay, but in a hard state the particles are of great benefit in keeping the soil open, and preventing the accumulation of noxious acids in it. For this reason lime (or strictly speaking carbonate of lime) is added to wet sour soils to drive off the carbonic acid gas, which is injurious. Peaty soils by its aid and good drainage may be rendered more or less fertile in time. Clayey soils by a similar process are brought nearer the ideal of what is required for the growth of plants.

Although lime is a great fertiliser of the soil and is always more or less essential in one form or another for a large number of plants, it is however injurious in the soil in which Rhododendrons, Azaleas, Kalmias and certain other plants belonging to the Heath family (p. 574) are grown.

Vegetable Soil or Humus contains an excess of organic material—that is, something which has been in a living state at one time either as plants or animals. This kind of soil, recognised by its dark colour, readily absorbs and retains water. It is useful for light sandy soils, which it binds more closely ; and for heavy soils, which it renders more porous. It also has the power of retaining plant foods to a great degree, and by its slow decay or rotting generates carbonic acid gas, which is a powerful dissolvent of mineral matters in the soil.

Wherever organic decay or rotting takes place heat is generated, and this is well instanced by farmyard manure, leaves &c. ; and when this heating process takes place in the soil, the latter becomes changed and rendered more fertile, and also warmer as a consequence of the fermenting processes which have taken place.

Humus, although very valuable, is not alone a suitable medium in which to grow plants, being too light, spongy and loose, and devoid of much mineral matter. It is most useful in conjunction with the other soils, and is chiefly obtained from farmyard manure, and the leaves of trees. The latter should be collected every autumn and stored in heaps. The action of the weather, rain-water, and an occasional turning over will soon reduce them to what is termed 'leaf-mould.'

In leaf-mould the gardener has a most valuable agent in rendering his soil suitable for the cultivation of plants. When well-rotted a little leaf-mould may be mixed with almost any soil used for the production of flowers, fruit, or vegetables, and some kinds are particularly fond of it as a rooting medium. Its use is frequently mentioned in the cultural operations in the body of the book.

IMPROVING THE SOIL

No matter how rich or how poor a soil may be, it can always be improved and rendered more fertile by various tillage operations. By digging or trenching the soil it becomes not only finer in texture and better mixed, but portions that were underneath before become exposed to the action of the weather—rain, frost, heat, cold &c., all of which produce important changes in it, making it as it were more digestible and acceptable to the roots of plants. Wet land cannot be successfully improved until means have been taken to drain away the water by furrows, ditches or pipes, or in the case of flower borders by having the bed filled with bricks, stones, rubble or some rough material through which the water will pass. An excess of wetness in the soil causes it to be cold, and the heat of the sun, instead of being used to promote the growth of the plant, is absorbed by the water. Stagnant water in the soil prevents the free access of air; hence acids are generated and bring about what is known as a sour condition.

Digging.—This is one of the most important and necessary operations for bringing the soil into a fertile condition. It is usually done with a spade or a fork, the object in view being to turn the upper layer of the soil completely upside down, so that what was underneath shall be exposed to the action of the sun and air, frost, snow, rain &c., and thus become more broken up and finer in texture.

Digging requires the exercise not only of physical strength but also of intelligence. Merely scraping the surface of the soil with the spade or the fork is not digging at all, and is of very little benefit, although to the uninitiated it may look quite as well on top as ground that has been properly dug. The object aimed at, however, is the improvement of the soil by crushing it, breaking it up, and completely inverting it. The spade or fork should therefore be driven straight down, almost at right angles, to the full length of the blade or tines, as the case may be, so that a good 'spit' or spadeful may be obtained. Where an odd man is employed for digging purposes it should be seen that he drives the tool straight down into the soil, as the more slanting the cut the quicker the ground is got over, and the less good is done to it. Where, however, the owner of the garden can perform the digging himself it would be an excellent substitute for exercises such as rowing, cricket, lawn-tennis &c.

Best time for digging.—Ground may be dug whenever it is not in a wet sticky condition, and when free from frost and snow. During the autumn and winter months, however, the work is seriously taken in hand after the crops have been cleared from the ground. The fresh upturned soil is then exposed until spring to the action of the weather, and owing to the rest given and the chemical changes that have taken place, it will be in a much improved condition either for sowing seeds or planting out fresh crops.

How to dig.—The novice usually regards digging as a simple operation until he has tried his hand at it for half an hour or so. In that short period he not only secures a serious backache and can hardly stand upright, but he has also got into difficulties in disposing of the soil which he has been trying to dig up. Instead of having a clean open furrow always in front of him into which to turn the next 'spit,' he finds he has nowhere to place it except back in the spot from which he has lifted it.

To give some idea as to how the work is to be done, let the reader imagine this page to represent a piece of ground which is to be dug. If it is only a small area the first furrow—represented by the top line of type—may be taken out from the top and transferred to the bottom outside where the last furrow or line of type stands. Furrow (or line of type) number two may then be dug a spade deep and turned into the space left open by the first one taken out. And so on, digging each row from left to right or *vice versa,* and pushing it forward into the vacant furrow, until the last one is reached. The furrow here may then be filled with the soil taken from the first opening, and thus the whole surface will not only have been turned over, but will stand on a different bottom from what it did before.

Should the piece of ground be too large to dig across it at once, it may be divided into two or more convenient portions. Let the reader imagine it divided into two portions like some pages of this book. The soil from the first furrow—represented in the columns by the top line of type—may then be placed over at the top right-hand side or column. Then the various rows (as represented by the lines of type) may be dug one after the other as before until the end is reached. The workman then turns right about face to begin plot number two—as it were from the bottom of the page. The soil from the furrow (represented by the bottom line of type in the right-hand column) is transferred to the furrow at the bottom of the first plot on the left and thus completes it.

Plot number two is then dug in the same way as number one, until the top is reached. And here the soil taken out when the work was begun is used to fill the last furrow.

If the work is properly done, the surface, although perhaps cloddy, will be fairly even and be without hills and hollows. Before proceeding to dig each line or row, all weeds on the surface, and also manure, if any, should be turned into the bottom of the open furrow, after which the soil is placed upon it or them. The surface may be left as turned over, with the exception of any particularly big clods which are easily reduced with a slap of the spade or fork. If the surface is thus left rough for the action of the winter frosts and rains the clods will gradually fall asunder and by the spring the surface will be in a beautifully mellow condition, requiring only slightly forking over more for the sake of appearance perhaps than anything else.

Double digging.—As the name indicates, this means digging the soil two spits deep. The first spit is taken out in the usual way described above, but the subsoil is simply dug and inverted without being removed from its original position. This is an excellent practice where the subsoil happens to be rather poor. It also opens the soil better and allows the water to drain away more readily from the roots of the plants. And while it is better than ordinary digging it is not nearly so hard as trenching.

Ridging up.—This operation is performed by digging in a straight line and putting the soil from the furrow up on the left or right to form a ridge. The base of the ridge may be two spits wide and may have a spadeful of soil from a furrow on each side placed on top of it. Or it need only be one spit or spade wide, so that there shall be twice as many ridges and furrows, thus exposing more soil to the action of the weather. If the ridge on which the soil is placed has been dug beforehand it will be all the better. Ground thus treated may be left during the winter months to become mellowed and fertilised for spring cropping.

A modification of ridging is to turn up a spit and invert it in the same place. Then on top of this place the next spit, leaving a corresponding hollow. The ground treated in this way will be a series of little hillocks and hollows.

In the spring time, before planting, the ridges are forked down and made level, and it will be found that the texture of the soil has been wonderfully improved by the treatment.

Trenching.—This is a much more serious operation than digging, and is also far harder work. Consequently it is not done more often than is absolutely necessary. The work is usually performed at the end of autumn or early winter. The object is to turn up a much greater depth of soil than can be accomplished by simple digging as described above, and to loosen and leaven the subsoil. As the latter, however, is generally much less fertile than the upper layer of soil, care must be taken that it does not completely replace that when the work is finished. Should it do so, more harm than good has been done, as the fertile soil has been placed at the bottom of the trench, where the roots cannot reach it; or if they do they have to work in a lower temperature, and this in itself may be detrimental to the roots. Unless they work in a proper temperature, the protoplasm (see p. 22) in the tender cells is unable to become active, with the result that water and the food it contains cannot be absorbed. Hence the leaves cannot assist in assimilating the food necessary to build up the tissues of the plants and to produce flowers, fruits &c.

Opening a Trench.—A piece of ground 3 to 4 feet wide should be marked off with a line. This is dug out about 3 or 4 feet—the width and depth of the trench usually correspond—and is wheeled to the other end of the ground, where the work is to finish. Indeed the work is laid out precisely in the same way as for digging, but there is of course much more soil to remove.

The first trench being open, the next piece of ground, the same width, is marked off and dug into it. The soil, however, should not be completely inverted as in digging, especially if the subsoil is poor, but should be placed in the trench in such a way that it is always more or less on an inclined plane. To secure this the soil from one trench may be allowed to invade the other, thus keeping the worst soil always at the bottom, and the best on top. Manure should be placed or mixed with the lower layers of soil, which in due course will become improved in texture and fertility.

Trenching may be repeated about every third or fourth year. But whenever it is done, the soil should, if possible, be trenched at right angles to the direction on the previous occasion, so as to secure greater distribution and change.

The same may be said in regard to digging. If the soil is dug from north to south on one occasion, it should be dug from east to west on another, or in any other different direction.

Drainage.—The necessity and importance of thoroughly draining the soil used in seed pots, pans &c. have been mentioned at p. 45. For the cultivation of outdoor crops, whether flowers, fruits, or vegetables, the necessity for a well-drained soil is no less important. Indeed the success of any crop depends very largely upon whether the soil is in such a porous state that water will readily pass away after wetting it, and not remain in pools either on the surface or some little distance below it. Even in the case of plants which grow naturally in marshy or boggy situations stagnant water is injurious and means should be taken to prevent its accumulation.

Farmers are often obliged to drain their land by laying pipes at various depths, or by having trenches or ditches made at various intervals so that the water may be carried away from the soil in which their crops are growing. In the cultivation of flowers, fruits and vegetables perfect drainage is often secured by thoroughly trenching the soil, deeply digging it, and ridging it up as explained. I have seen neglected kitchen-garden ground so sodden with water that the surface became covered with the green slime so characteristic of stagnant moisture. But after it had been well trenched and left exposed during the winter months it became quite porous, and now bears good crops annually. The soil, therefore, cannot be turned up too much, and if the subsoil is too poor to bring to the surface occasionally it may be at least turned over as explained under 'Double digging.'

In wet heavy soil all the stones and rougher portions may be placed at the bottom to act as drainage much in the same way as 'crocks' in a flower-pot. Flower borders very often require to be thoroughly drained with a layer of brickbats, clinkers, stones, mortar-rubbish &c. at a depth of three or four feet when devoted to the cultivation of certain plants, such as Oncocyclus Irises (p 918), Mariposa Lilies (p. 872) and other plants which readily succumb to stagnant moisture at the roots in our climate.

The reason why wet ground is so injurious to plant life is because the temperature is lower than in drained land, and the passage of air gases through the soil is prevented. As long as the soil is in a wet condition so long will the heat of the sun be used to evaporate the water instead of warming the soil. Even in the hottest summer, the warm water will come to the surface, while the cold will sink down and chill the roots and retard, if not altogether stop, their absorptive process as described at p. 27. And thus the plants suffer perhaps in the midst of an abundance of plant food which is not placed at their disposal in a proper state owing to bad drainage.

LIMING THE SOIL

Besides digging and trenching the soil, it may, if in a wet condition, also be improved by the addition of lime, which is a most important agent in fertilising the soil. It not only 'sweetens' sour wet land, but makes it drier and more porous, and thus increases its temperature.

It also frequently liberates potash (one of the most important plant foods locked up in the soil), and it is also a great preventive of vermin in the shape of slugs, snails, caterpillars and grubs of all kinds. At the rate of from 10 to 20 cwts. per acre or ½ lb. to 1 lb. per square yard may be applied during the winter months in a powdered state, when the soil is free from vegetation. But while there can be no doubt as to the fertilising properties of lime care must be taken not to be continually dressing the soil with it. It is a bad plan, not only with lime, but with all other fertilisers, to apply one kind only. A change is beneficial, and chemical changes take place between one and the other, but all the changes are more or less useful to the soil. See p. 1030.

Gas Lime also may be applied during the same season, but must be given in smaller quantities, say at the rate of 1 to 2 cwts. per acre, as in a fresh state it is very injurious to plant life. It is, however, a deadly enemy to insect pests. The fresher the gas lime the smaller the proportion of it should be used; about two or three ounces to the square yard would be quite sufficient. The longer it is exposed the less injurious to plant life does it become, as many of its poisonous gases escape into the atmosphere.

HOEING AND RAKING

Next to the spade and the fork the *hoe* is perhaps the most important tool used in garden cultivation. It is made in many forms, shapes and sizes, but that known as the 'Draw Hoe,' which the gardener pulls towards him as he walks forwards, and that known as the 'Dutch Hoe,' which he pushes from him as he walks backwards, are the best known and most used.

Whatever the shape, however, the object in view is the same. The hoe plays many parts in the garden. It is used for drawing drills for seeds, Potatoes or other tubers, for breaking and loosening the soil, for thinning out seedlings, for cutting up weeds, and for keeping the surface of the soil generally clean and in good condition. Like everything else connected with gardening, hoeing requires a good deal of intelligence and knowledge of the crops, otherwise the workman may soon do far more harm than good.

The *rake* also plays an important part in the improvement of the soil. It is indispensable for levelling the ground in the preparation of seed-beds, clearing the weeds and rubbish generally from borders, shrubberies, lawns &c., and its use in the hands of an intelligent workman can never be a drawback in keeping a garden in good order.

MULCHING

The reader will find this expression used many times in connection with the cultural directions given for the various plants described in this work. It is therefore advisable to explain its meaning and value.

A 'mulch' or 'mulching' in gardening language means an extra covering of soil, rotten leaves, or manure, either separately or combined, placed over the roots of plants either after the latter have been newly planted, or at any period during their growth when it may be considered advisable.

The advantages of mulching may be summed up as follows:—

(i.) During the hot and dry summer months it prevents excessive evaporation from the soil and thus not only preserves the moisture for the roots to absorb, but it also prevents the soil from becoming excessively hot by day, and cold by night, thus maintaining a more regular temperature.

(ii.) In winter it protects the roots from frost and also keeps the soil warmer.

(iii.) When a rich mulch is applied to newly planted trees and shrubs, it not only has the above advantages, but the manurial matters contained in it are washed down into the soil and enrich it with food for the benefit of the newly formed or forming roots.

(iv.) A good mulching of rich manure to all kinds of fruit trees after they have set their fruits is highly beneficial in assisting them to swell rapidly and ripen more quickly. Once a plant—no matter whether a tree, shrub, or annual—begins to develop fruit and seeds, a demand is made upon its reserve materials. If these are not quite sufficient to meet the demand, it is easy to conceive that the extra food supplied by means of a good mulching will supply the deficiency.

PLANT FOODS AND MANURES

Besides being a rooting medium for plants, the soil may also be regarded as a storehouse containing some of the particular kinds of food required to build up the stems, leaves, flowers, and fruits of plants in conjunction with other foods obtained from the air. A soil is said to be fertile when it contains an abundance of plant food, and sterile or barren when this food is scarce or altogether absent. The great object a gardener has in view therefore is to treat the soil in such a way that it shall always be in a more or less fertile condition, and never be deficient in any of the essential plant foods.

Plants require at least twelve different kinds of food to develop properly, and to bring their flowers or fruits to perfection. These foods are: —

Oxygen
Carbon
Hydrogen
Nitrogen
Sulphur
Phosphorus
Potash
Iron
Lime
Soda
Magnesia
Chlorine

These are present in all cultivated plants in greater or less quantities, besides many other things which are said to be non-essential. As a rule all the foods except Nitrogen, Potash, and Phosphorus are readily obtained from the air, soil, or water by the plants themselves. Lime is often present in sufficient quantities, and is very important for fruit or leguminous crops. Only a small trace of Iron is necessary, yet without its aid the green colouring of leaves cannot be developed. The air supplies Oxygen and Carbon, which are absorbed in a combined state by the leaves of plants and are afterwards split up—the Carbon being retained to build up the frame of the plant, while a large amount of the Oxygen is liberated by the pores of the leaves (see p. 33).

All the mineral substances are provided by the roots, but they must first of all be dissolved by water. Salt (chloride of sodium) is generally found in plants which grow naturally near the sea, and where these have been brought under cultivation, dressings of salt may be given to the soil occasionally, as in the case of Asparagus (p. 1145) and Seakale (p. 1121) &c.

Three important plant foods

The good growth of plants practically depends upon the presence of *Nitrogen, Potash, and Phosphorus* in such a state that they can readily enter into the plant and assist the other foods in building it up. The absence of any one of these three foods cannot be made good by an extra supply of the others. The gardener need not often worry himself in regard to the nine other foods mentioned above, with the exception of *Lime*; but he should always satisfy himself that his soil is not deficient to any great extent in any of these three foods, the peculiarities and properties of which are referred to below.

Nitrogen.—Although so abundant in the atmosphere—being four-fifths of the whole—this gas is very shy of uniting with others, or of being absorbed by the leaves of plants like carbonic acid gas. There is an exception in the case of Leguminous plants (see pp. 322–355). It has been found that plants of this order have the peculiarity of developing small nodules on their roots. These nodules are supposed to be the work of bacteria which possess the power of absorbing large quantities of nitrogen from the air, thus bringing it into contact with and fertilising the soil. For this reason it is unnecessary to give Leguminous crops, such as Peas, Beans, Lupins &c., nitrogenous manures. Indeed dressing the soil growing such crops with nitrogenous manures is likely to do a good deal of mischief. The plants get as it were surfeited with a food which they are capable of obtaining easily for themselves. They may require potash and phosphatic manures but never or rarely ever nitrogenous ones. And soil poor in nitrogen may be enriched by the cultivation of Leguminous plants, afterwards digging or ploughing them into the soil.

Uses of Nitrogen.—Nitrogen promotes the growth of plants, giving the leaves a deeper colour and making them larger and more luxuriant. It is chiefly obtained from farmyard manure, and the droppings of various animals—pigs, horses, cows, chickens &c.—but never in a free state. Guano—the excreta of seabirds in South America—nitrate of soda, nitrate of potash and sulphate of ammonia are the principal artificial sources which supply nitrogen. The manures containing it require to be used in very small quantities.

Nitrate of Soda is a mineral salt found in Chili, Peru, and Bolivia, and has of late years become very popular as a quick-acting manure for all kinds of crops. It resembles dirty common salt in appearance, and like that substance readily dissolves in water. Care should therefore be taken when storing it to deposit it in a dry place, otherwise it will lose much of its value.

Care must be exercised in its use for garden crops. If too much is given the leaves of the plants will shrivel up as if they had been boiled. About 1 lb. to forty square yards is usually considered to be a safe dressing, and it may be applied with advantage to such crops as Potatoes, Cabbages and other Cruciferous crops (p. 1113), Beet, Tomatoes &c.

Owing to its fleeting character, and the ease with which it is washed out of the soil, it is obvious that nitrate of soda is only of real value to the roots of any crop of plants in an actively growing state. It should therefore be used to hasten the growth of young plants, or to bring others more quickly into a state of full growth.

As a rule it is best used by itself and not in conjunction with other manures, such as superphosphate which decomposes it. If mixed with armyard or other organic manures which have the power of extracting and destroying all its value, it is so much waste, and at the same time there is little use in applying it to any soil which is not actually well supplied with phosphates and potash—the two other important manures referred to above.

Sulphate of Ammonia.—This is very similar in appearance to Nitrate of Soda, but is if anything a little dirtier in colour. It is manufactured from the ammonia liquor of gas works, and is somewhat stronger and more durable in its action than Nitrate of Soda; consequently it need not be used in such large quantities. Although it may be mixed with Superphosphate, Sulphate of Ammonia should never be used in conjunction with lime or chalk, ashes, or a manure known as 'Thomas's phosphate' or 'basic slag,' as these drive off the ammonia from it.

Gas Liquor.—This contains a good percentage of ammoniacal manures, and is stronger in action than Sulphate of Ammonia. A gallon of it should be diluted with at least four gallons of water, and may be used as a liquid manure.

Soot.—This is not only a good nitrogenous manure but also contains a certain amount of phosphoric acid and potash, and may therefore be said to be more or less ideal as it contains the three most important plant foods. It is valuable not only for its manurial properties but also for its great value in keeping away slugs, snails, and other vermin.

Other Nitrogenous Manures.—Under this heading may be placed almost all refuse which has been in a living state at one time or another. The refuse from slaughterhouses, such as dried blood, and meat, hoof-parings, old rags, hides, leather &c., are all more or less of manurial value, but they do not yield up their food until in a thoroughly decayed state. They are therefore rather slow-acting in the soil, but are nevertheless valuable for perennial crops.

Phosphatic Manures.—These are derived from phosphates, and have a marked effect in the production and early ripening of fruit, and all garden crops benefit by their presence, as they are compounds of potash, lime, and ammonia—all valuable plant foods. Superphosphate of lime, bones, phosphate of ammonia, and phosphate of potash, are the chief phosphatic plant foods used.

Superphosphate of Lime.—When in a good condition this is a fine greyish powder, dry and friable to the fingers, and not wet and sticky. It has a peculiar smell and tastes very sour or 'limy.' About 1 cwt. of it contains 12–14 lbs. of phosphoric acid, or more than is yielded by a ton of good farmyard manure. It should be used carefully, about 1 lb. to every 4 or 5 square yards being sufficient for vegetable and fruit crops. A smaller quantity, however, is safer for the flower border, applied in spring and lightly forked into the soil as the plants are about to begin growth. The best time as a rule for dressing the soil with superphosphate is in spring when seeds are being sown. If the soil is in a poor condition, superphosphate by itself will not be of much use, and the ground should have had a good dressing of farmyard manure the previous autumn to make it valuable.

Bones.—The value of Bones as a phosphatic manure has long been recognised, and many gardeners are very partial to having a sprinkling of 'bone-meal' or 'bone-flour' always mixed with soil when repotting or replanting. Bones are, however, a very slow-acting manure, but the process of decomposition and consequent quicker action may be assisted by having them finely crushed. In the form of bone-meal, unadulterated and unsteamed bones contain about 45–50 per cent. of phosphate of lime, and also a small quantity—4–5 per cent.—of ammonia salts. Steamed or boiled bones contain about 60 per cent. of phosphate of lime, but not so much ammonia. The phosphate of lime, however, is not soluble in pure water, but when acted upon by the carbonic acid in ordinary water, rain &c. it gradually dissolves and fertilises the soil.

A manure called *dissolved bones* or *bone superphosphate* is produced by mixing a certain quantity of sulphuric acid (or oil of vitriol) with raw bone-meal—about 9 cwts. of sulphuric acid to 20 cwts. of bone-meal. About one-third of the insoluble phosphate of lime in the bones is changed by the chemical process into a soluble condition, and is thus more readily available for the roots of plants. A reasonable dressing for fruit and vegetable crops is about 1–2 lbs. to every ten square yards, and may be given in winter or spring.

Basic Slag.—This is a dark coloured powdery substance also known as 'Thomas's phosphate' and 'basic cinder.' It contains a good deal of oxidised iron (commonly called 'rust'), but not to any injurious extent. Its chief value lies in the amount of lime it contains in the form of a phosphate, and it is particularly valuable for improving soils which are destitute of lime or chalk, and also vegetable or animal remains called humus. It is best applied in autumn or winter at the rate of 4–8 ounces to the square yard, or 10–20 cwts. to the acre, more or less according to the poverty of the soil in regard to lime and humus. It is good for fruit trees and most garden crops, but will give disappointing results if applied in spring instead of autumn or winter as recommended.

Potash.—While nitrogenous food increases luxurious growth, and phosphatic food large crops of fruit, potash increases the quality and flavour by manufacturing the sugary ingredients so noticeable in Apples, Pears, Plums, Grapes, Beetroot &c.

Garden soil is rarely lacking in potash, and a supply may always be liberated by the addition of lime. Soil which has been well manured with dung for years is very rich in potash, and in such cases it is scarcely necessary to trouble about obtaining special artificial manures. Where, however, the soil is poor in potash, it will be improved by lime, basic slag, and *kainit*—the latter a cheap and economical manure containing sulphate of potash, common salt, sulphate of magnesia (Epsom Salts) and chloride of magnesia. Besides these, sulphate of potash, muriate of potash, and phosphate of potash all yield potash, as do also the ashes of all vegetables and plants generally. Most fruit and vegetable crops, and particularly those belonging to the Cruciferous group, are improved by the addition or presence of potash manures in the soil.

Other manures.—Besides the above manures, which are all more or less artificially manufactured and brought into a more or less soluble condition so as to be available as plant-food, it is now necessary to refer to others which may be termed natural manures. Of these the best known is certainly :—

Farmyard manure.—This consists of the refuse of litter, solid and liquid excreta of all animals, &c. from stables. To be fit for use in the garden it should be turned over constantly and well watered, to prevent the escape of the volatile ammonia. The water however should not be allowed to drain away and be lost for ever, but means should be taken to secure it and use it as a liquid manure.

Good farmyard manure contains about 10–12 lbs. of *nitrogen*, 10–15 lbs. of *potash*, and 4–9 lbs. of *phosphate*, that is only 24–36 lbs. or less than ½ cwt. altogether of essential plant foods out of a ton of material. The remaining 19½ cwts. of straw or litter however are not absolutely valueless. The material has been alive at one time, and has been produced by the soil and air. When returned to the soil therefore it acts as a kind of tonic to the mineral particles in the soil, it retains moisture in hot weather, and keeps out cold in winter, and has other useful properties that make it on the whole an excellent and popular manure. Some gardeners have an inclination to do without farmyard manure altogether, and rely a good deal upon the chemical or artificial productions referred to above. It is a mistake, however, as mentioned before, to be always dressing soil with the same kinds of manures, and a medium course is best adopted. While farmyard manure may not give such good or clean results as chemical manures for some crops, such as Potatoes for example, that are subject to fungoid diseases, the use of chemical manures entirely would leave the soil in the course of time impoverished owing to the absence of all humus, and this as already mentioned is a very important ingredient of most soils.

Peat-moss litter, now largely employed for bedding down animals, is also a good manure, but its heating qualities, although rapid, are not so lasting as ordinary stable manure. It however soaks up liquids from the stables much better and holds it in the tissues.

Poultry manure.—Where fowls are kept it is a mistake to waste the cleanings from their pens. A ton of chicken manure yields 18–25 lbs. of *nitrogen*, 12–24 lbs. of *phosphate*, and 6–12 lbs. of *potash*. The excreta should be used with care and should always be well mixed with soil, or made up in bags or sacks and sunk in tanks of water to yield a good liquid manure.

Pigeon manure is even richer in manurial value than that of chickens. A ton contains about 72 lbs. of *nitrogen*, 48 lbs. of *phosphates*, and 25 lbs. of *potash*. It may be used with care in the same way as chicken manure. Indeed the excreta of all animals make excellent manures and are well worth saving for garden purposes. A few experiments in using them will soon enable the gardener to find out the most useful quantities to use.

Guano.—This is the excreta and decayed bodies of the sea-birds that frequent the rocky islands near the coast of Peru. In a saleable state it is a dark brownish or snuff-coloured powder, with a peculiar smell of its own, and weighs about 70 lbs. to the bushel. As a manure its value depends mainly on the amount of ammonia, soluble and insoluble phosphates, and alkaline salts which it contains. One ton of good Peruvian Guano is considered to be equal in manurial value to either 33½ tons of farmyard manure; 20 tons of horse-dung; 38½ tons of cow-dung; 22½ tons of pig-dung; or 14½ tons of 'night soil' or human excrement. Looked at in another way it may be stated that out of 1 cwt. (112 lbs.) of good Guano, there is about 8 lbs. of *nitrogen*, 18 lbs. of *phosphoric acid*, and 3½ lbs. of *potash*—the quantity of each per ton of course being 20 times as much. For garden purposes about 2–4 cwts. per acre, or 1–2 ozs. to the square yard, is a reasonable dressing, but care should be exercised in its use, and it is better to give smaller amounts to most crops until the action has been tested. As a liquid manure it is very valuable, about a tea-spoonful—more or less—to a couple of gallons of water being a good stimulant for flowers. It is better not to wet the foliage of plants with liquid manures of any kind owing to their rather vigorous action.

When buying Guano or any other high class manure it is always advisable to obtain a warranty as to the amount of available nitrogen, (or ammonia), phosphates, and potash contained in them.

Fish Guano.—This is the dried and powdered refuse from cod and herring and other fish factories, and may be regarded as containing a fair amount of *nitrogen* and *phosphoric acid.* According to the kind of fish used, this guano may contain from 7 to 14 per cent. of nitrogen in the form of ammonia; 13–30 per cent. of phosphate of lime; and only 2–3 per cent. of potash. To be of much value as a fertiliser the oily matters should have been extracted as far as possible, as the presence of oil retards the action of the manure and gives unsatisfactory results. The action of Fish Guano is somewhat similar to that of Peruvian Guano, but it may be used a little more freely, say about 2–10 cwts. per acre, or at the rate of 1-4 ozs. to the square yard.

The above are the principal manures in use, but in various seaside localities seaweed is much valued, chiefly owing to the *potash* salts contained in it. A ton of fresh seaweed contains about 10 lbs. of *nitrogen,* 10 lbs. of *phosphoric acid,* 30–45 lbs. of *potash,* and about 50 lbs. of common salt. It may be turned over several times in a heap and allowed to decompose like ordinary farmyard manure, and in this state may be dug into the soil in the same way.

Old rags, rapecake dust, meat refuse, horn shavings and almost any vegetable remains free from fungus diseases may also be used for manuring the soil.

Coal ashes, which are often recommended in ignorance, should never be applied to any decent soil, as they do more harm than good. If used at all, it should be only to make sticky clayey soil more porous.

PART II

THE HARDY FLOWER GARDEN

The modern Flower Garden embraces the cultivation of such a variety of plants that it may be as well to enumerate the different groups or sections in which they are usually placed. Thus, many gardens have a place set apart purposely for the cultivation of rock-plants and alpines; also specially prepared borders for choice herbaceous perennials of all sorts; streams, pools, or lakes for water and marsh plants; and also sufficient space for the cultivation of ornamental trees and shrubs.

Although the plants belonging to the various groups are described in their natural orders in the following pages, and may easily be found by referring to the Index, there is a certain convenience in having a list of them all together for ready reference. To facilitate obtaining further information about them, the page at which any particular plant is described is given immediately after the name.

Should the reader, therefore, wish to have a list of the best Annuals, Herbaceous Perennials, Rock Plants, Water Plants, Bulbous Plants, Ornamental and Flowering Trees and Shrubs &c., he has only to consult the lists given below. If he does not know any plant mentioned, he will find a description of it with cultural information at the page quoted after the name.

At the same time should there be a plant in his or her garden the name of which is unknown it will be possible to 'run it down' or determine to which natural order or genus it belongs by means of the 'Key' given at p. 121.

Although the lists are fairly exhaustive the author does not recommend the cultivation of all of them in every garden. This would indeed be impossible in most cases, but a selection should be made according to the taste of the reader, and the known capability of his soil, and what it will grow. As a rule it is more satisfactory to grow a few different kinds of plants well, and study their peculiarities and tastes, their likes and dislikes for certain soils and situations &c., than to fill a garden with many kinds that may be quite unsuitable, or cannot be properly attended to.

ANNUALS AND BIENNIALS

ANNUALS are plants which spring from seed, flower, produce seed, and die in one year or season of growth. Many biennial or even perennial plants are treated as annuals, as it is less trouble to raise them from seeds every year than to house or protect the roots during the winter. 'Hardy' annuals are those plants which may be sown and grown from start to finish in the open air. 'Tender' or 'half hardy' annuals, on the other hand, require to be raised in gentle heat, and must not be planted out until all danger from frost is past; or if sown outside, the operation must be performed later than for hardy annuals.

Hardy annuals may be sown either in pots or pans, or in the places outside in the garden in which they are intended to bloom: whether in rows or patches of course depends on the grower. The soil should be well prepared, raked over, and levelled. The seed should be sown very thinly, and only slightly covered, and gently patted down with a flat board or the back of a spade, and the general instructions given from p. 42 to p. 46 must be borne in mind.

When flowers are required in summer or autumn, hardy annuals may be sown out of doors in March and April. If required in early summer or late spring, then the seeds should be sown early in September. When thinned out, the sturdy seedlings may be afterwards transplanted to their flowering positions, sufficiently early to become established before winter. For further particulars the reader is referred to the article on seeds and seed sowing, pp. 24, 42.

Biennials.—These are plants which usually require two years or seasons of growth to develop fully from seed before they die naturally. The seeds of hardy biennials are usually sown from June to August, and pricked out or transplanted in the autumn to the places in which they are to bloom the following year. Tender biennials must be sown in autumn in a frame or cool house, and the plants must be sheltered in these places until about the end of the following May, when they may be planted out.

The following is a selection of the best annuals and biennials, or plants that may be treated in the same way.

LIST I

A Selection of the most Ornamental Annual and Biennial Plants, or those that may be treated as such

The page at which description and cultural information for each are given appears after the name.

- Abronia umbellata, p. 760.
- Acroclinium roseum, p. 508.
- Adonis autumnalis, p. 145.
- Alyssum maritimum, p. 210.
- Amberboa moschata, p. 551.
  - odorata, p. 551.
- Antirrhinum, vars., p. 710.
- Aphanostephus ramosissimus, p. 497.
- Arabis arenosa, p. 206.
- Asperula azurea setosa, p. 487.
- Baeria coronaria, p. 524.
- Balsam, p. 294.
- Brachycome iberidifolia, p. 497.
- Calandrinia discolor, p. 262.
  - grandiflora, p. 262.
- Calendula officinalis, p. 544.
- Callistephus hortensis (the type) and various China Asters, p. 499,
- Campanula Loreyi, p. 567.
  - macrostyla, p. 566.
  - Medium, p. 566.
  - sibirica, p. 568.
  - spicata, p. 568.
- Candytuft, p. 218.
- Canterbury Bells, p. 566.
- Carnations, Marguerite, p. 241.
- Celosia, p. 762.
- Centaurea cyanus, p. 550.
  - moschata, p. 551.
- Centauridium Drummondi, p. 496.
- Centranthus macrosiphon, p. 489.
- Cheiranthus, p. 204.
- China Aster, p. 499.
- Chrysanthemum carinatum, p. 531.
  - coronarium, p. 531.
- Clarkia elegans, p. 452.
  - pulchella, p. 453.
- Clintonia pulchella, p. 555.
- Cockscomb, p. 762.
- Collinsia bicolor, p. 717.
- Collinsia verna, p. 718.
- Collomia coccinea, p. 663.
- Convolvulus tricolor, p. 686.
- Coreopsis Drummondi, p. 518.
- Cosmidium burridgeanum, p. 522.
- Cosmos bipinnatus, p. 522.
- Datura, p. 692.
- Delphinium, annual vars., p. 158.
- Dianthus sinensis, p. 243.
- Digitalis purpurea, vars., p. 722.
- Dimorphotheca annua, p. 544.
  - Ecklonis, p. 544.
- Dracocephalum, vars., p. 751.
- Erysimum alpinum, p. 214.
  - Perofskianum, p. 215.
- Eschscholtzia, vars., p. 197.
- Eucharidium grandiflorum, p. 455.
- Eutoca viscida, p. 669.
- Forget-me-not, p. 677.
- Foxglove, p. 722.
- Gaillardia amblyodon, p. 527.
  - picta, p. 527.
- Gaura Lindheimeri, p. 457.
- Gilia achilleæfolia, p. 664.
  - coronopifolia, p. 664.
  - densiflora, p. 664.
  - dianthoides, p. 664.
  - liniflora, p. 665.
  - micrantha, p. 665.
  - tricolor, p. 665.
- Glaucium, vars., p. 196.
- Godetia Whitneyi, p. 454.
- Gypsophila elegans, p. 248.
  - viscosa, p. 249.
- Helianthus annuus, p. 515.
  - petiolaris, p. 517.
- Helichrysum arenarium, p. 508.
  - bracteatum, p. 508.
- Honesty, p. 207.
- Iberis coronaria, p. 218.
  - umbellata, p. 220.
- Ionopsidium acaule, p. 216.
- Ipomopsis elegans, p.
- Kaulfussia amelloides, p. 498.
- Kochia scoparia, p. 766.
- Lamarckia aurea, p. 961.
- Lasthenia californica, p. 524.
- Lathyrus odoratus, p. 348.
- Lavatera trimestris, p. 274.
- Layia elegans, p. 523.
  - platyglossa, p. 324.
- Leptosiphon densiflorus, p. 664.
  - roseus, p. 665.
- Leptosyne calliopsidea, p. 519.
  - maritima, p. 519.
  - Stillmani, p. 519.
- Limnanthes Douglasi, p. 292.
- Linaria aparinoides, p. 708.
  - bipartita, p. 708.
  - multipunctata, p. 709.
  - reticulata, p. 709.
  - spartea, p. 710.
- Linum grandiflorum, p. 283.
  - usitatissimum, p. 284.
- Lunaria biennis, p. 207.
- Lupinus affinis, p. 324.
  - Hartwegi, p. 325.
  - luteus, p. 325.
  - Menziesii, p. 325.
  - mutabilis, p. 325.
  - nanus, p. 325.
  - pilosus, p. 325.
  - subcarnosus, p. 326.
- Malcolmia maritima, and var. alba, p. 214.
- Malope grandiflora, p. 271.
  - malacoides, p. 271.
  - trifida, p. 271.
- Malva crispa, p. 275.
  - mauritiana, p. 275.
- Marigold, p. 544.
- Martynia fragrans, p. 735.
  - proboscidea, p. 735.
- Matthiola annua, p. 201.
  - incana, p. 202.
- Mentzelia Lindleyi, p. 458.
- Michauxia campanuloides, p. 560.
- Mignonette, p. 222.

- Mina lobata, p. 684.
- Morning Glory, p. 683.
- Myosotis alpestris, p. 677.
  - dissitiflora, p. 677.
- Nemesia strumosa, p. 707.
  - versicolor, p. 707.
- Nemophila atomaria, p. 667.
  - aurita, p. 667.
  - insignis, p. 667.
  - maculata, p. 667.
- Nicotiana, vars., p. 695.
- Nigella damascena, p. 155.
  - hispanica, p. 155.
- Nolana atriplicifolia, p. 686.
- Nycterina selaginoides, p. 718.
- Œnothera, vars., p. 453.
- Omphalodes linifolia, p. 671.
- Oxalis rosea, p. 293.
- Oxyura chrysanthemoides, p. 523.
- Palava flexuosa, p. 271.
- Papaver croceum, p. 191.
  - glaucum, p. 191.
  - Rhœas, vars., p. 192.
  - somniferum, vars., p. 192.
- Petunia, p. 697.
- Phacelia, vars., p. 668.
- Pharbitis hispida, and vars., p. 683.
- Phlox Drummondi, p. 660.
- Picotees, p. 240.
- Pinks, p. 246.
- Platystemon californicus, p. 190.
- Polygonum orientale, p. 770.
- Poppies, p. 191.
- Reseda odorata, p. 222.
- Rhodanthe Manglesii, p. 508.
- Salpiglossis sinuata, p. 700.
- Sanvitalia procumbens, p. 512.
- Saponaria calabrica, p. 249.
- Scabiosa caucasica, p. 491.
- Schizanthus pinnatus, p. 699.
  - retusus, p. 700.
- Senecio elegans, p. 541.
- Silene Armeria, p. 251.
  - Atocion, p. 251.
  - compacta, p. 251.
  - pendula, p. 253.
  - quadrifida, p. 254.
- Snapdragon, p. 710.
- Specularia speculum, p. 569.
- Sphenogyne speciosa, p. 544.
- Statice spicata, p. 603.
- Stocks, p. 201.
- Suworowi, p. 603.
- Sweet Pea, p. 348.
  - Scabious, p. 491.
  - Sultan, p. 551.
  - William, p. 238.
- Tagetes erecta, p. 526.
  - patula, p. 526.
  - signata, p. 526.
- Tobacco, p. 695.
- Trifolium incarnatum, p. 334.
- Tropæolum majus, p. 290.
  - minus, p. 291.
  - peregrinum, p. 291.
- Venidium calendulaceum, p. 545.
- Verbascum phœniceum, p. 702.
- Verbena hybrida, p. 740.
- Viola, vars., p. 228.
- Virginian Stock, p. 214.
- Viscaria oculata, p. 257.
- Wallflower, p. 204.
- Whitlavia grandiflora, p. 669.
- Xeranthemum annuum, p. 547.
- Zaluzianskia, p. 718.
- Zauschneria californica, p. 452.
- Zea Mays, p. 964.
- Zinnia elegans, p. 512.

THE HARDY HERBACEOUS BORDER

In the flower garden proper, the hardy herbaceous border is undoubtedly the most important feature. Its beauty and variety depend almost entirely on the taste of the owner, and a knowledge of the plants used. Some herbaceous borders nearly always present a bright and attractive appearance owing to a good and tasteful selection of plants arranged with due regard to their various heights, their period of blossoming, and the contrasts produced by the colour of their flowers. Other borders, however, which receive but little or no attention present anything but an attractive appearance.

Many things have to be considered in the making of a good flower border—such as site, aspect, soil, habit, height, colour, and general requirements of each species, and whether they are better grown as individual specimens or in large or small masses or groups to produce the best effect. Indeed it may be said that the chief object in view in making a hardy herbaceous border is to secure a pleasing natural picture with plants and flowers of different habits, heights, colours &c.

The nature of the locality must always be taken into consideration, and only those plants should be grown that will flourish with ordinary good care and attention. It must be borne in mind that some plants thrive in one locality and make glorious pictures in the flower border, while in other districts—perhaps not many miles distant—they prove to be utter failures, notwithstanding every attention to cultural details.

Unfortunately, this is one of the peculiar things that puzzle gardeners not a little. Many, of an experimental turn of mind, resolve to make a difficult plant grow by hook or by crook if good cultivation can do it. Very often they are highly successful, and very often not. And curiously enough, many of these so-called difficult plants to cultivate, when they fail under what is considered the best treatment, often astonish the disgusted cultivator by growing vigorously and flowering profusely when they have been neglected and left to shift for themselves. A writer in the 'Garden' has illustrated this point very clearly in connection with *Tropæolum speciosum* (see p. 291). He says:—This species was planted in many positions, care being taken to afford a porous root-run and a sufficiency of shade, for in the south it is almost impossible to establish this Tropæolum in a situation exposed to the full rays of the sun. After the planting was concluded a certain quantity of roots remained over, and these were placed in holes dug at the foot of a spreading young yew tree, the soil not being disturbed further than was necessary for covering the roots. After this was effected, these latter were not given another thought, as they were not expected to succeed, and had only been roughly planted as an alternative to being thrown away. In course of time all the carefully planted and tended Tropæolums disappeared, and for a couple of years the forgotten roots beneath the yew did nothing to advertise their existence. In the third year, however, a vivid splash of vermilion on one of the branches of the yew drew attention to the fact that the plants were not only alive, but in the best of health, in which state they have since remained, garlanding the sombre foliage during the summer months with an opulence of colour that year by year increases in extent.'

The moral of this is that the reader must not be discouraged if he should fail to grow a plant under one set of conditions. Should this unfortunately happen, then he should at least try totally different conditions in his garden before finally rejecting the plant as unsuitable.

Site of Herbaceous Borders.—Where a large and varied selection of plants from all quarters of the globe is to be grown in the same border, the best general site is one facing any point of the compass between east and west. There are several choice plants—*Tropæolum speciosum*, mentioned above, for example—that will flourish facing north or east; but the great majority of choice border plants require a position sheltered from the bleak cold winds of the east and north. This shelter is better and more picturesque if given by means of ornamental trees and shrubs, or thick evergreen hedges. When herbaceous borders are made against walls and outside greenhouses care should be taken not to have the back portion choked up with vegetation with an idea of hiding the wall. The latter object can be secured by training various plants and climbers like Ivies, Vitis, Smilax, Choisya, Clematis, Jasmine, Bignonia &c. over them.

But there is no necessity whatever to have beautiful flower borders near buildings or walls of any sort, or even fringing shrubberies, although all these situations are valuable if properly utilised. The flower border may stand alone in the grass and may be so arranged that sufficient shelter is afforded from a distance by hedges, trees, buildings &c.

Width.—The width of flower borders is often so great that the plants towards the back are so placed as to be too far off to be properly attended to without constantly walking over the border and treading the soil down into a perfectly hard state. Five to six feet wide is quite enough for any border, and it should be so arranged that it may be viewed from both sides. Where flowers are largely cut for room decoration this will be found a convenient width, as it will admit of the flowers being cut from the centre of the bed without trespassing on the soil or the intervening plants.

Where very broad stretches of ground may be used for the flower border, pathways of grass about 2 ft. wide may be left between the borders. This will allow for the erection at intervals of trellises, arches, pergolas &c., over which climbers from each side may be trained up. Where herbaceous borders run parallel with greenhouses or conservatories, as they frequently do, a pathway at the back by the walls will be a great convenience, and will also allow a freer circulation of air among the plants. The taste of the cultivator, however, will always decide where the borders are to be made, how they are to be planted, and the kinds of plants to be used.

Soil.—For general purposes a rich loamy well-drained soil is best. It may be leavened by the addition of manure, leafsoil, peat and sand, as may be required for any particular plant grown in it. It should be from 2 to 3 feet deep and, before planting, well dug or trenched as occasion demands. In the following pages there is frequent reference to 'ordinary good garden soil.' This means any soil which is well-drained and consists of loam, sand, leaf-mould and other vegetable and animal refuse, clay, peat &c., all of which have been thoroughly worked with the addition of manures for years past. It would be difficult without analysis to say of what such a soil was composed.

Planting.—As the herbaceous border is usually intended to last for several years, care should be exercised in selecting and arranging the plants properly at first, to avoid subsequent alterations. If the borders are arranged as recommended it will not be necessary to have all the tall plants at the back, the others sloping downwards to the dwarf ones in front, thus giving a painful air of symmetrical arrangement. Many of the taller kinds may be placed in the centre, and behind or in front of them the dwarfer ones may be planted, according as to whether they require plenty of sunshine or shadow. In fact, the plants should be made to assist each other as much as possible in this respect. A tall plant may be readily used for shading a dwarfer one by its shadow during the hotter and sunnier portion of the day. In the same way a tender plant may be sheltered from the winds if arranged near another of a more hardy constitution.

Massing or Grouping.—It often happens that one plant by itself fails to produce a good effect. It may be straggling in habit and small in flower, and is lost amid more showy surroundings. It is somewhat similar to a solitary soldier in a more or less gay uniform, and a whole battalion dressed in the same way. The individual looks commonplace and excites no comment, but when he is one of a thousand he contributes his share to the brilliant effect of the whole. So it is with many plants. When they are ineffective as single specimens they become handsome and desirable subjects in a flower border when grown together in large masses. If Violets, Primroses, Saxifrages, Asters, Aubrietias, Larkspurs, Anemones, Campanulas, Coreopsis, Gentians, Phloxes, Pentstemons &c. were grown simply as single plants at a great distance from each other, they would never produce the effect, or be so much appreciated as they are when grown in masses and groups.

Colour and Time of Flowering.—This is an important point to consider in arranging the plants. In the following lists some of the best flowers are arranged according to the principal predominating colour, so that the reader will find no difficulty in making a selection for himself. The period of blooming should also be taken into consideration, with a view to obtaining flowers in the open air for as long a period as possible. In this way the flower border will continue to maintain its interest from one year's end to another. As it is often useful to know what plants are likely to bloom in the dullest months of the year, a list of those which blossom between September and May is given at p. 94. It is scarcely necessary to give a detailed list of those which flower from May to September, as during this period there are so many, and there is no difficulty in finding them. In regard to the trees and shrubs, however, a list of which is given at p. 107, some pains have been taken to give the months in the year at which representatives of most of them are usually in blossom.

General Arrangement of the Flower Border.—This has been treated so well by Miss Jekyll, of Munstead, in a paper read before the Horticultural Society that I take the liberty of reproducing her remarks here:—

'An essential feature in a garden of hardy flowers is a well-arranged mixed border. It is here that we can show the true summer flowers at their best, but it is here, more than anywhere else, that the "art of many sacrifices" must be put in practice. For the main spaces plants should be chosen of bold and striking beauty, but as a border of all large plants would have a kind of monotony, certain spaces, chiefly towards the front, but also running back in many parts among groups of taller things, should be planted with those of lower growth. The chief plants for such a border are Oriental Poppies (p. 191), Pæonies (p. 165), the boldest of the Irises (p. 917), Day-Lilies (p. 815), Herbaceous Spiræas (p. 364), Œnotheras (p. 453), a few of the best Campanulas (p. 562), Delphiniums (p. 158), Lilies (p. 842), three or four of the best perennial Sunflowers (p. 515), the tall blue Sea-Holly (p. 465), Tritomas (p. 817), Mulleins (p. 701), Thalictrums (p. 137), Dahlias (p. 519), Hollyhocks (p. 272), and a few others. These are the plants that will form the great effects of the border. The nearest parts, and some spaces between the taller growths, should have groups of plants of lower stature, and yet of a somewhat bold form of foliage. Of these the broad-leaved Saxifrages (p. 415), and Funkias (p. 816), are among the best. Still dwarfer plants, such as Pinks (p. 238), and Pansies (p. 233), are suitable for the extreme edge.

'Each kind of plant in the mixed border should stand in a bold group, and the groups, differing in size and shape, according to the aspect of the plant, should follow one another in a carefully arranged sequence of colour, keeping plants of a colour together, such as Mulleins with Œnotheras, and Tritoma with Oriental Poppy. In the case of the last named, it is convenient to actually intergroup the two kinds, for the foliage of the Poppies dies away early and the blank space it would have left becomes covered by the later-growing leaves of the autumn-blooming Tritoma.

'Groups of red, orange and strong yellow follow well, and help each other by forming a rich colour harmony. Flowers of a strong blue colour, like Delphiniums, seem to ask for a contrast, such as that of white Lilies (p. 846) or the pale yellow of *Œnothera lamarckiana* (p. 453), and *Verbascum phlomoides* (p. 702), the best of the Mulleins. In practice it is perhaps best to exclude bulbous plants from the mixed border, "especially in light soils that need frequent enrichment," as the disturbing of the ground, occasioned by division of the plants and manuring, is perilous to the bulbs, the foliage of which has usually disappeared by autumn, and whose places are probably forgotten unless marked by unsightly labels. But exception should be made in favour of the three common Lilies, the White (p. 846), the Orange (p. 848) and the Tiger (p. 857). Labels must be absolutely abolished in the ornamental garden. (See p. 47.)

'Some families of plants, especially those whose beauty is in infinite variety, may best be enjoyed in places almost by themselves, where the eye would be undisturbed by the consideration of other kinds of flowers. A garden of Lilies may be made of great beauty, the groups of Lilies appearing among dwarf and moderate sized shrubs and hardy Ferns. The Pæony family (p. 165) is another example of a large range of summer flowers that deserve such treatment in addition to their use in other places. A whole wealth of garden beauty exists in this one tribe alone, for, apart from those best known—namely, the double varieties of the old garden kind, the Chinese herbaceous (p. 168) and the old Tree Pæony (p. 171)—there are many other kinds, both species and their cultivated varieties, that are happily available for garden use.

'Many a beautiful garden picture may also be made by the placing of quite a small number, or even a single example of some stately plant in a quiet place by itself, such as a group of *Lilium giganteum* (p. 849) with its noble flower spikes and its broad glistening leaves. A group of this grand Lily, in partial shade and backed by trees or small shrubs, shows one of the stateliest forms that can be seen of a flowering plant of one year's growth.

'Such another example is offered by the Californian Tree Poppy (*Romneya Coulteri*, p. 190) which, when well established, will grow in one season into a bush 7 feet high and as much through. It is a remarkably beautiful plant and to an eye trained to harmonies of colour singularly pleasing in the relation of its large milk-white flowers and pale blue-green leaves. It delights in a sunny well-sheltered place in a light soil.

'Old walls are easily made beautiful by sowing a few seeds of Wallflowers (p. 240), Snapdragon (p. 710), Red Valerian (p. 490), and Rock Pinks (p. 245), and even a heap of hungry sand will grow to perfection the handsome Lyme Grass (p. 959) and the beautiful Sea-Holly (p. 465).

'There is no end to the interest of this kind of gardening, and the harder the problem the greater the triumph when, for instance, a difficult or ugly piece of ground has been *compelled* into beauty, and what was before unsightly is made delightful to the eye, and with such skill that the result looks, not as if it had been *done*, but as if it had *happened*.

'It should be remembered that a beautiful garden is a place of pleasant labour and happy restfulness, and that the more it can be filled with perfect pictures, the more it gives delight to the eye and solace to the mind, and the nearer it approaches to the making of an earthly paradise.'

The following is a list of the best Herbaceous Perennial Plants for cultivation in the flower border. After each name the page at which information in regard to description, culture &c. is given is indicated in figures.

LIST II

Acanthus latifolius, p. 736.
longifolius, p. 736.
mollis, p. 736.
spinosissimus, p. 737.
spinosus, p. 737.
Achillea ægyptiaca, p. 528.
asplenifolia, p. 528.
Eupatorium, p. 528.
Ptarmica, fl. pl., p. 529.
tomentosa, p. 529.
Aconitum, vars., p. 162.
Adonis vernalis, p. 144.
Æthionema cordifolium, p. 216.
Alstrœmeria, vars., p. 914.
Althæa rosea, p. 271.
Alyssum saxatile, p. 210.
Anchusa italica, p. 675.
Anemone, vars., p. 139.
Anthemis tinctoria, p. 530.
Anthericum, vars., p. 825.
Aquilegia, vars., p. 155.
Arnebia echioides, p. 679.
Arum italicum, p. 954.
Arundo Donax, p. 958.
Asclepias tuberosa, p. 647.
Asphodelus luteus, p. 823.
ramosus, p. 823.
Aster, vars., p. 500.
Astilbe, vars., p. 414.
Astragalus monspessulanus, p. 348.
Baptisia australis, p. 323.
Betonica grandiflora, p. 755.
Bocconia cordata, p. 195.
Buphthalmum grandiflorum, p. 511.
salicifolium, p. 511.
speciosum, p. 511.
Calceolaria alba, p. 704.
Kellyana, p. 705.
Calla palustris, p. 955.
Callirhoë involucrata, p. 276.
Calystegia dahurica, p. 684.
pubescens, p. 684.
Campanula abietina, p. 563.
alpina, p. 563.
carpatica, p. 563.
dahurica, p. 564.
glomerata, p. 564.
grandis, p. 565.
lactiflora, p. 565.
latifolia, p. 565.
mirabilis, p. 566.
nobilis, p. 566.
persicæfolia, p. 566.
pyramidalis, p. 567.
rotundifolia, p. 568.
Trachelium, p. 568.
turbinata, p. 563.
Van Houttei, p. 565.
Carbenia benedicta, p. 551.
Cassia marilandica, p. 354.
Catananche bicolor, p. 553.
cærulea, p. 553.
Centaurea americana, p. 549.
babylonica, p. 549.
macrocephala, p. 550.
ragusina, p. 551.
Centranthus ruber, p. 489.
Cephalaria alpina, p. 491.
Chelone glabra, p. 712.
obliqua, p. 712.
Chrysanthemum, vars., p. 531.
Chrysobactron Hookeri, p. 826.
Chrysogonum virginianum, p. 511.
Cimicifuga racemosa, p. 164.
Clematis recta, p. 135.
Cnicus, vars., p. 548.
Columbine, p. 155
Commelina cælestis, p. 807.
Convallaria majalis, p. 813.
Convolvulus althæoides, p. 685.
Soldanella, p. 684.
Coreopsis grandiflora, p. 518.
lanceolata, p. 518.
tenuifolia, p. 519.
Coronilla iberica, p. 345.
varia, p. 345.
Corydalis lutea, p. 200.
nobilis, p. 200.
Crambe cordifolia, p. 221.
pinnatifida, p. 222.
Cypripedium Calceolus, p. 892.
spectabile, p. 893.
Dahlia, vars., p. 519.
Delphinium, vars., p. 158.
Dicentra eximia, p. 198.
spectabilis, p. 199.
Dictamnus Fraxinella, p. 296.
Dodecatheon integrifolium, p. 626.
Jeffreyanum, p. 626.
Meadia, p. 626.
Doronicum caucasicum, p. 540.
plantagineum, p. 540.

- Dracocephalum argunense, p. 751.
    - austriacum, p. 751.
    - grandiflorum, p. 751.
    - ruyschianum, p. 752.
- Echinops Ritro, p. 547.
    - ruthenicus, p. 547.
- Epilobium angustifolium, p. 452.
    - rosmarinifolium, p. 452.
- Epimedium pinnatum, p. 184.
- Eranthis hyemalis, p. 154.
- Eremurus, vars., p. 824.
- Erigeron speciosus, p. 506.
- Erodium Manescavi, p. 287.
- Eryngium, vars., p. 465.
- Erythronium, vars., p. 869.
- Ferula communis, p. 468.
    - glauca, p. 469.
    - tingitana, p. 469.
- Funkia, vars., p. 816.
- Gaillardia aristata, p. 527.
    - grandiflora, p. 527.
- Galega officinalis, p. 337.
- iana Andrewsii, p. 653.
    - asclepiadea, p. 653.
    - lutea, p. 655.
- Geranium, vars., p. 285.
- Geum, vars., p. 374.
- Gillenia trifoliata, p. 369.
- Gunnera manicata, p. 446.
    - scabra, p. 447.
- Gypsophila paniculata, p. 249.
    - Steveni, p. 249.
- Hacquetia Epipactis, p. 467.
- Hedysarum, vars., p. 345.
- Helenium autumnale, p. 526.
    - nudiflorum, p. 527.
- Helianthus, vars., p. 515.
- Helichrysum arenarium, p. 508.
- Helleborus, vars., p. 152.
- Hemerocallis aurantiaca major, p. 815.
    - flava, p. 815.
    - fulva, p. 815.
    - minor, p. 816.
- Hesperis matronalis, p. 213.
- Heuchera sanguinea, p. 427.
- Hibiscus militaris, p. 279.
    - palustris, p. 279.
    - roseus, p. 279.
- Iberis, vars., p. 218.
- Inula glandulosa, p. 510.
    - Hookeri, p. 510.
- Iris, vars., p. 917.
- Jeffersonia diphylla, p. 184.
- Kniphofia, in variety, p. 817.
- Larkspur, p. 158.
- Lathyrus grandiflorus, p. 348.
    - latifolius, p. 348.
    - rotundifolius, p. 349.
    - splendens, p. 349.
- Liatris elegans, p. 495.
    - spicata, p. 495.
    - squarrosa, p. 495.
- Lilium, vars., p. 842.
- Linaria, vars., p. 707.
- Lindelofia spectabilis, p. 672.
- Linum alpinum, p. 283.
    - arboreum, p. 283.
    - flavum, p. 283.
    - narbonense, p. 284.
    - perenne, p. 284.
- Lobelia cardinalis, p. 556.
    - fulgens, p. 557.
    - splendens, p. 557.
- Lupinus nootkatensis, p. 326.
    - polyphyllus, p. 326.
- Lychnis chalcedonica and vars., p. 255.
    - coronaria, p. 255.
    - diurna fl. pl., p. 256.
    - fulgens, p. 256.
    - haageana, p. 257.
    - Lagascæ, p. 257.
    - vespertina fl. pl., p. 257.
    - Viscaria, p. 258.
- Lysimachia clethroides, p. 629.
    - punctata, p. 629.
- Lythrum Salicaria, p. 451.
    - virgatum, p. 451.
- Malva campanulata, p. 276.
    - moschata, p. 275.
- Meconopsis cambrica, p. 194.
    - nepalensis, p. 194.
    - Wallichi, p. 194.
- Medicago falcata, p. 333.
- Melittis Melissophyllum, p. 754.
- Menyanthes trifoliata, p. 657.
- Mertensia sibirica, p. 676.
    - virginica, p. 676.
- Monarda didyma, p. 750.
    - fistulosa, p. 750.
- Monkshood, p. 162.
- Morina longifolia, p. 490.
- Myosotis dissitiflora, p. 677.
    - palustris, p. 678.
    - sylvatica, p. 678.
- Nepeta Mussini, p. 750.
- Œnothera, vars., p. 453.
- Omphalodes verna, p. 671.
- Onobrychis montana, p. 346.
- Ononis aragonensis, p. 332.
    - rotundifolia, p. 332.
- Orobus cyaneus, p. 350.
    - flaccidus, p. 350.
    - lathyroides, p. 350.
    - variegatus, p. 351.
    - vernus, p. 351.
- Ostrowskya magnifica, p. 559.
- Ourisia coccinea, p. 723.
- Pæonia, vars., p. 165.
- Pansy, p. 233.
- Papaver bracteatum, p. 191.
    - lateritium, p. 191.
    - nudicaule, p. 191.
    - orientale, p. 191.
    - pilosum, p. 192.
- Pentstemon, vars., p. 712.
- Phlomis ferruginea, p. 757.
    - fruticosa, p. 757.
    - herba-venti, p. 757.
    - Russelliana, p. 757.
- Phlox, vars., p. 658.
- Phygelius capensis, p. 711.
- Physalis Francheti, p. 690.
- Physostegia imbricata, p. 754.
    - virginiana, p. 754.
- Phyteuma comosum, p. 561.
- Phytolacca decandra, p. 767.
- Plagianthus Lyalli, p. 277.
- Platycodon grandiflorum, p. 559.
- Plumbago Larpentæ, p. 604.
- Podophyllum Emodi, p. 185.
    - peltatum, p. 185.
- Polemonium cæruleum, p. 665.
    - confertum, p. 665.
    - humile, p. 666.
    - pulchellum, p. 666.
- Polyanthus, vars., p. 620.
- Polygonatum multiflorum, p. 811.
- Polygonum cuspidatum, p. 759.
    - sachalinense, p. 770.
    - sphærostachyum, p. 770.
    - vaccinifolium, p. 770.
- Potentilla, vars., p. 376.
- Primula, vars., p. 604.
- Prunella grandiflora, p. 754.
    - webbiana, p. 754.
- Pyrethrum achilleæfolium, p. 535.
    - roseum, p. 536.
    - uliginosum, p. 535.

Ranunculus aconitifolius, p. 146.
  acris fl. pl., p. 146.
  amplexicaulis, p. 146.
  asiaticus, p. 147.
  Lyalli, p. 149.
  monspeliacus, p. 149.
  montanus, p. 149.
  spicatus, p. 150.
Rheum, vars., p. 770.
Rhexia virginica, p. 449.
Romneya Coulteri, p. 190.
Rudbeckia, vars., p. 514.
Salvia argentea, p. 747.
  patens, p. 748.
Santolina Chamæcyparissus, p. 529.
  incana, p. 530.
Saponaria ocymoides, p. 249.
Saxifraga cordifolia, p. 419.
  crassifolia, p. 419.
Scabiosa caucasica, p. 491.
Scutellaria alpina, p. 753.
  macrantha, p. 753.
Sedum kamtschaticum, p. 439.
  populifolium, p. 440.
Sedum Sieboldi, p. 440.
  spectabile, p. 441.
Senecio, vars., p. 540.
Sidalcea candida, p. 276.
  malvæflora, p. 277.
Silene alpestris, p. 251.
  Elisabethæ, p. 252.
  maritima, p. 252.
  Schafta, p. 254.
Silphium laciniatum, p. 511.
Sisyrinchium grandiflorum, p. 943.
Solidago, vars., p. 496.
Spigelia marilandica, p. 649.
Spiræa Aruncus, p. 364.
  lobata, p. 364.
  palmata, p. 365.
Stachys lanata, p. 755.
Statice latifolia, p. 602.
  speciosa, p. 603.
  tatarica, p. 603.
Stokesia cyanea, p. 493.
Symphyandra Hoffmanni, p. 570.
  pendula, p. 570.
  Wanneri, p. 570.
Symphytum asperrimum, p. 673.
  caucasicum, p. 673.
Thalictrum, vars., p. 137.
Thermopsis fabacea, p. 323.
  lanceolata, p. 323.
Tiarella cordifolia, p. 426.
Tradescantia virginica and vars., p. 807.
Tricyrtis hirta, p. 879.
Tritoma Uvaria, p. 818.
Trollius, vars, p. 151.
Tropæolum pentaphyllum, p. 291.
  polyphyllum, p. 291.
  speciosum, p. 291.
Veratrum album, p. 881.
  nigrum, p. 881.
  viride, p. 881.
Verbascum Chaixi, p. 702.
  olympicum, p. 702.
  phlomoides, p. 702.
Veronica, vars., p. 724.
Vicia argentea, p. 347.
  Cracca, p. 347.
Vinca herbacea, p. 645.
Viola, vars., p. 228.
Zauschneria californica, p. 452.

LIST III

A Selection of Herbaceous Plants etc. that will grow in more or less Shady Places. The description, culture, and propagation will be found at the page mentioned after the names.

Acanthus, vars., p. 736.
Achillea Ptarmica fl. pl., p. 529.
Aconitum, vars., p. 162.
Actæa, vars., p. 164.
Ajuga reptans, p. 759.
Anemone, vars., p. 139.
Aquilegia vulgaris, p. 158.
Aralia edulis, p. 470.
  nudicaulis, p. 470.
  racemosa, p. 470.
Aristolochia, vars., p. 773.
Artemisia, vars., p. 538.
Arum Dracunculus, p. 954.
  italicum, p. 955.
Arundinaria, vars., p. 965.
Asclepias, vars., p. 647.
Asperula odorata, p. 487.
Asphodelus ramosus, p. 822.
Aster, vars., p. 500.
Astilbe, vars., p. 414.
Astrantia, vars., p. 466.
Baneberry, p. 164.
Baptisia, vars., p. 323.
Betonica grandiflora, p. 755.
Borago orientalis, p. 674.
Bromus, vars., p. 959.
Buphthalmum grandiflorum, p. 511.
  salicifolium, p. 511.
Calystegia vars., p. 684.
Campanula, vars., p. 563.
Centaurea montana, p. 551.
Chelidonium majus, p. 196.
Clematis, vars., p. 131.
Convallaria majalis, p. 813.
Coreopsis lanceolata, p. 518.
Cortusa Matthioli, p. 624.
Corydalis nobilis, p. 200.
Crambe cordifolia, p. 221.
Cyclamen, vars., p. 626.
Cynoglossum Omphalodes, p. 672.
Cypripedium, vars, p. 892.
Delphinium, vars., p. 158.
Dicentra spectabilis, p. 199.
Digitalis, vars., p. 722.
Dodecatheon, vars., p. 626.
Doronicum Pardalianches, p. 540.
  plantagineum, p. 540.
Dracocephalum Ruyschianum, p. 752.
Echinops, vars., p. 547.
Elymus arenarius, p. 959.
Epigæa repens, p. 578.
Epilobium angustifolium, p. 452.
Epimedium, vars., p. 184.
Equisetum sylvaticum, p. 1024.
  Telmateia, p. 1023.
Eranthis hyemalis, p. 154.
Eryngium alpinum, p. 465.
Erythronium, vars., p. 869.
Eupatorium, vars., p. 494
Ferula, vars., p. 468.

Fragaria, vars., p. 376.
Fritillaria, vars., p. 857.
Funkia, vars., p. 816.
Galanthus nivalis, p. 906.
plicatus, p. 906.
Gaultheria, vars., p. 575.
Gentiana septemfida, p. 656.
Geranium, vars., p. 285.
Geum, vars., p. 374.
Gillenia trifoliata, p. 369.
Hedysarum, vars., p. 345.
Helianthus, vars., p. 515.
Helleborus, vars., p. 152.
Helonias bullata, p. 878.
Hemerocallis, vars., p. 815.
Heuchera, vars., p. 427.
Hieracium aurantiacum, p. 553.
Hop, p. 788.
Humulus Lupulus, p. 788.
Hypericum, vars., p. 265.
Inula Helenium, p. 510.
Iris, vars., p. 917.
Lamium, vars., p. 756.
Lathyrus, vars., p. 348.
Lavatera, vars., p. 274.
Leucojum, vars., p. 907.
Liatris spicata, p. 495.
Lilium, vars., p. 842.
Linnæa borealis, p. 482.
Lupinus polyphyllus, p. 826.
Lychnis diurna, p. 256.
vespertina, p. 257.
Lysimachia, vars., p. 629.
Lythrum, vars., p. 451.
Malva, vars., p. 275.
Meconopsis nepalensis, p. 194.
Wallichi, p. 194.
Medicago, vars., p. 333.
Melittis Melissophyllum, p. 754.
Mertensia, vars., p. 676.
Mimulus moschatus, p. 720.
Mitchella repens, p. 488.
Monarda, vars., p. 750.
Mulgedium alpinum, p. 554.
Myosotis, vars., p. 677.
Narcissus, vars., p. 893.
Œnothera, vars., p. 453.
Omphalodes verna, p. 671.
Onopordon Acanthium, p. 548.
Ornithogalum, vars., p. 842.
Pæonia, vars., p. 165.
Panicum altissimum, p. 962.
capillare, p. 962.
virgatum, p. 962.
Phlomis, vars., p. 757.
Physostegia, vars., p. 754.
Podophyllum, vars., p. 185.
Polemonium reptans, p. 666.
Polygonatum multiflorum, p. 811.
Polygonum affine, p. 768.
cuspidatum, p. 769.
Primula, vars., p. 604.
Pyrola, vars., p. 598.
Ranunculus aconitifolius, fl. pl., p. 146.
Rubus, vars., p. 371.
Rudbeckia californica, p. 514.
hirta, p. 514.
laciniata, p. 514.
triloba, p. 515.
Ruscus aculeatus, p. 810.
racemosus, p. 810.
Sanguinaria canadensis, p. 195.
Saponaria officinalis, p. 249.
Saxifraga cordifolia, p. 419.
crassifolia, p. 419.
Fortunei, p. 421.
Geum, p, 421.
umbrosa, p. 426.
Scilla, vars., p. 838.
Sedum spectabile, p. 441.
Smilacina bifolia, p. 813.
stellata, p. 813.
Spigelia marilandica, p. 649.
Spiræa, vars., p. 364.
Symphytum, vars., p. 673.
Thalictrum, vars., p. 137.
Tradescantia virginica, p. 807.
Trillium grandiflorum, vars., p. 880.
Trollius, vars., p. 151.
Tulipa, vars., p. 860.
Tussilago fragrans, p. 539.
Uvularia grandiflora, p. 879.
Valeriana, p. 488.
officinalis, p. 489.
Phu, p. 489.
Veratrum album, p. 881.
nigrum, p. 881.
Vernonia, vars., p. 493.
Vinca, vars., p. 645.
Viola, vars., p. 228.
Xerophyllum asphodelioides, p. 878.

LIST IV

Trailing and Climbing Plants, for covering Bowers, Trellises, Railings, Old Trees, Stumps, Rockwork, Banks, Walls &c.

Abobra viridiflora, p. 462.
Actinidia polygama, p. 267.
Adlumia cirrhosa, p. 199.
Akebia quinata, p. 179.
Apios tuberosa, p. 351.
Aristolochia Sipho, p. 773.
tomentosa, p. 773.
Bignonia capreolata, p. 731.
Bryonia dioica, p. 461.
Calystegia dahurica, p. 684.
pubescens, p. 684.
Cissus davidiana, p. 809.
japonica, p. 809.
platanifolia, p. 809.
viticifolia, p, 810.
Clematis, vars., p. 131.
Convolvulus arvensis, p. 685.
mauritanicus, p. 685.
Eccremocarpus scaber, p. 734.
Grammatocarpus volubilis, p. 459.
Hablitzia tamnoides, p. 765.
Hedera, vars., p. 471.
Holbœllia latifolia, p. 179.
Humulus Lupulus, p. 788.
Ipomæa, vars., p. 683.
Jasminum nudiflorum, p. 636.
officinale, p. 687.
revolutum, p. 687.
Lapageria, vars., p. 810.
Lardizabala biternata, p. 179.
Lathyrus, vars. (Sweet Peas), p. 348.
Lonicera Caprifolium, p. 483.
confusa, p. 483.
flava, p. 483.
japonica, p. 484.
Periclymenum, p. 484.
Lycium europæum, p. 692.
Menispermum canadense, p. 178.
Mina lobata, p. 684.
Mutisia decurrens, p. 551.

Passiflora cærulea, p. 460.
Periploca græca, p. 647.
Polygonum baldschuanicum, p. 768.
    dumetorum, p. 769.
Smilax, vars., p. 808.
Solanum jasminoides, p. 689.
Stachyurus præcox, p. 268.
Tamus communis, p. 884.
Tecoma radicans, p. 782.
Thunbergia alata, p. 735.
Tropæolum, vars., p. 290.
Virginian Creeper, p. 309.
Vitis, vars., p. 307.
Wistaria sinensis, p. 338.

LIST V

A Selection of Hardy Plants with White Flowers

Achillea Clavennæ, p. 528.
    Ptarmica pl., p. 529.
    serrata pl., p. 529.
    umbellata, p. 529.
Aconitum Napellus albus, p. 163.
Actæa spicata, p. 164.
Allium neapolitanum, p. 831.
Alyssum maritimum, p. 210.
Ammobium alatum, p. 509.
Androsace Chamæjasme, p. 622.
Anemone alba, p. 139.
    alpina, p. 140.
    japonica alba, p. 142.
    narcissiflora, p. 142.
    nemorosa, p. 142.
    sylvestris, p. 144.
    thalictroides, p. 138.
    trifolia, p. 144.
    vitifolia, p. 144.
Antennaria dioica, p. 507.
Anthemis Biebersteini, p. 530.
Antirrhinum majus album, p. 710.
Aquilegia vulgaris alba, p. 158.
Arabis, vars., p. 205.
Arenaria montana, p. 260.
    verna, p. 260.
Argemone grandiflora, p. 193.
Asperula odorata, p. 487.
Asphodelus ramosus, p. 823.
Astilbe japonica, p. 414.
    rivularis, p. 414.
Astragalus hypoglottis albus, p. 343.
Bellium, vars., p. 498.
Calla æthiopica, p. 955.
    palustris, p. 955.
Callistephus hortensis, vars., p. 499.
Campanula cæspitosa alba, p. 563.
Campanula carpatica alba, p. 563.
    glomerata alba, p. 564.
    lactiflora, p. 565.
    lamiifolia, p. 565.
    latifolia alba, p. 565.
    Medium alba, p. 566.
    nitida, p. 566.
    persicæfolia alba, p. 566.
    pyramidalis alba, p. 567.
    rotundifolia alba, p. 568.
    speciosa, p. 568.
    Trachelium alba, p. 568.
Cardamine trifolia, p. 207.
Centranthus ruber albus, p. 489.
Cerastium, vars., p. 258.
Chrysanthemum Leucanthemum, sinense, numerous white-flowered vars., p. 531.
Clematis Flammula, p. 133.
    montana, p. 134.
    recta, p. 135.
Convallaria majalis, p. 813.
Crambe cordifolia, p. 221.
    pinnatifida, p. 222.
Crocus, white vars., p. 936.
Cynoglossum linifolium, p. 671.
Dahlia, white vars., p. 519.
Dianthus Caryophyllus, white vars., p. 240.
    deltoides albus, p. 244.
    plumarius albus, p. 246.
Dictamnus Fraxinella alba, p. 296.
Digitalis, vars., p. 722.
Dryas octopetala, p. 374.
Epilobium angustifolium album, p. 452.
Erinus alpinus albus, p. 723.
Erythronium Dens-canis album, p. 870.
    giganteum, p. 870.
    grandiflorum, p. 871.
    Hartwegi, p. 871.
Eupatorium ageratoides, p. 494.
    aromaticum, p. 494.
Fritillaria Meleagris alba, p. 859.
Funkia grandiflora, p. 817.
Galanthus, vars., p. 906.
Galega officinalis alba, p. 337.
Gentiana asclepiadea alba, p. 653.
Geranium pratense album, p. 286.
    sylvaticum album, p. 287.
Gladiolus Colvillei albus, p. 950.
Gypsophila elegans, p. 248.
    paniculata, p. 249.
Helleborus niger, p. 153.
Hepatica triloba alba, p. 141.
Hesperis matronalis alba plena, p. 213.
Hoteia japonica, p. 414.
Hutchinsia alpina, p. 220.
Hyacinthus, vars., p. 833.
Iberis corifolia, p. 218.
    correæfolia, p. 218.
    saxatilis, p. 219.
    semperflorens, p. 219.
Iris florentina, p. 922.
    germanica alba, p. 923.
    pumila albida, p. 929.
Isopyrum thalictroides, p. 154.
Jeffersonia diphylla, p. 184.
Lamium maculatum album, p. 756.

- Lathyrus latifolius albus, p. 348.
- Leucanthemum lacustre, p. 534.
- Leucojum æstivum, p. 907.
  - vernum, p. 907.
- Libertia formosa, p. 942.
- Lilium Browni, p. 845.
  - candidum, p. 846.
  - japonicum, p. 850.
  - longiflorum, p. 851.
  - speciosum album, p. 855.
  - washingtonianum, p. 857.
- Linum monogynum, p. 284.
  - perenne album, p. 284.
- Lupinus polyphyllus albus, p. 326.
- Lychnis vespertina fl. pl., p. 257.
- Malva moschata alba, p. 275.
- Michauxia campanuloides, p. 560.
- Muscari botryoides alba, p. 832.
- Myosotis sylvatica alba, p. 678.
- Narcissus poeticus, p. 903.
- Nicotiana affinis, p. 695.
- Nierembergia rivularis, p. 698.
- Nymphæa alba, p. 186.
- Nymphæa hybrids, p. 187.
- Œnothera eximia, p. 454.
  - speciosa, p. 454.
  - taraxacifolia, p. 455.
- Onosma albo-roseum, p. 681.
- Ornithogalum arabicum, p. 842.
  - pyramidale, p. 842.
- Ornithogalum umbellatum, p. 842.
- Oxalis Acetosella, p. 293.
- Pæonia, vars., p. 165.
- Pansy, vars., p. 233.
- Paradisia Liliastrum, p. 823.
- Phlox, numerous white hybrids, p. 662.
  - subulata alba, p. 662.
- Platycodon grandiflorum album, p. 559.
- Polianthes tuberosa, p. 915.
- Potentilla alba, p. 377.
- Primula involucrata, p. 610.
  - Munroi, p. 610.
  - nivalis, p. 612.
  - pubescens alba, p. 614.
- Prunella grandiflora alba, p. 754.
- Pyrethrum Parthenium fl. pl., p. 536.
  - roseum album, p. 537.
  - serotinum,p.535.
- Ranunculus aconitifolius plenus, p. 146.
  - alpestris, p. 146.
  - amplexicaulis, p. 146.
- Romneya Coulteri, p. 190.
- Sagittaria sagittifolia plena, p. 806.
- Sanguinaria canadensis, p. 195.
- Saxifraga ajugæfolia, p. 417.
  - burseriana, p. 418.
  - cæspitosa, p. 419.
  - ceratophylla, p. 426.
  - Cotyledon, p. 419.
  - diapensioides, p. 420.
  - granulat fl. pl., p. 421.
- Saxifraga Hosti, p. 421.
  - hypnoides, p. 422.
  - lactea, p. 422.
  - longifolia, p. 423.
  - Mertensiana, p. 423.
  - nivalis, p. 424.
  - pallida, p. 424.
  - rocheliana, p. 425.
- Scabiosa caucasica alba, p. 491.
- Scilla bifolia alba, p. 839.
  - campanulata alba, p. 840.
  - festalis alba, p. 839.
- Sedum album, p. 439.
- Sidalcea candida, p. 276.
- Silene alpestris, p. 251.
  - maritima, p. 252.
  - Zawadskii, p. 254.
- Sisyrinchium grandiflo album, p. 943.
- Smilacina bifolia, p. 813.
- Spiræa Aruncus, p. 364.
  - Filipendula, p. 364.
  - Ulmaria, p. 365.
- Statice Limonium album, p. 602.
- Tiarella cordifolia, p. 426.
- Tradescantia virginica alba, p. 807.
- Trillium grandiflorum, p. 880.
- Triteleia uniflora, p. 830.
- Tulipa, white vars., p. 860.
- Verbascum phœniceum album, p. 702.
- Verbena, white vars., p. 740.
- Vinca minor alba, p. 646.
- Viola cornuta alba, p. 229.
- Yucca filamentosa, p. 821.
  - gloriosa, p. 821.
- Zephyranthes Atamasco, p. 909.
  - candida, p. 910.

LIST VI

A Selection of Hardy Plants with Red, Crimson, Scarlet, or Pinkish Flowers

- Acæna microphylla, p. 381.
- Achillea asplenifolia, p. 528.
  - Millefolium roseum, p. 529.
- Æthionema, vars., p. 216.
- Allium acuminatum, p. 831.
- Althæa rosea, p. 271.
- Amaryllis Belladonna, p. 912.
- Androsace carnea, p. 621.
- Anemone coronaria, vars., p. 140.
- Anemone fulgens, p. 141.
  - hortensis, p. 144.
  - japonica, p. 142.
  - pavonina, p. 141.
- Anomatheca cruenta, p. 944.
- Antennaria dioica, p. 507.
- Anthyllis montana, p. 334.
- Antirrhinum majus, p. 710.
- Apocynum androsæmifolium, p. 646.
- Aquilegia canadensis, p. 156.
- Aquilegia Skinneri, p. 157.
- Arabis blepharophylla, p. 206.
- Armeria Cephalotes, p. 603.
  - dianthoides, p. 603.
  - maritima, p. 603.
- Asclepias tuberosa, p. 648.
- Aster, vars., p. 500.
  - China, vars., p. 499.
- Astragalus monspessulanus, p. 348.

Begonia, vars., p. 462.
Bellis, vars., p. 498.
Betonica grandiflora, p. 755.
Brodiæa coccinea, p. 827.
rosea, p. 829.
Bryanthus erectus, p. 582.
Butomus umbellatus, p. 806.
Calandrinia umbellata, p. 262.
Callirhoë digitata, p. 275.
involucrata, p. 275.
Calystegia pubescens pl., p. 684.
Centranthus ruber, p. 489.
Chrysanthemum, vars., p. 531.
Colchicum, vars., p. 875.
Coronilla varia, p. 345.
Cortusa Matthioli, p. 624.
Dahlia, vars., p. 519.
Daphne Cneorum, p. 778.
Delphinium nudicaule, p. 161.
Dianthus, vars., p. 238.
Dicentra eximia, p. 198.
spectabilis, p. 199.
Dictamnus Fraxinella, p. 296.
Digitalis purpurea, p. 722.
Dodecatheon, vars., p. 626.
Epilobium angustifolium, p. 452.
Erica, vars., p. 580.
Erinus alpinus, p. 723.
Erodium Manescavi, p. 207.
Erythræa littoralis, p. 651.
Fuchsia, vars., p. 455.
Geranium Lamberti, p. 286.
macrorhizon, p. 286.
Geum coccineum, p. 374.
sanguineum, p. 286.
Gladiolus, vars., p. 947.
Hedysarum coronarium, p. 345.
multijugum, p. 346.
Helianthemum, vars., p. 226.
Hepatica triloba rubra, p. 141.
Hibiscus militaris, p. 279.
moscheutos, p. 279.
roseus, p. 279.
Incarvillea Delavayi, p. 733.
Olgæ, p. 733.
Ipomopsis elegans, p. 664.
Kniphofia Uvaria, vars., p. 818.
Lathyrus, vars., p. 347.
Lavatera Olbia, p. 274.
trimestris, p. 274.
Liatris, vars., p. 495.
Lilium Catesbæi, p. 847.
chalcedonicum, p. 847.
tenuifolium, p. 856.
thunbergianum, p. 848.
tigrinum, p. 857.
umbellatum, p. 857.
Linum grandiflorum, p. 283.
Lobelia fulgens, p. 557.
Tupa, p. 557.
Lunaria biennis, p. 207.
Lychnis, vars., p. 255.
Lythrum, vars., p. 450.
Malva, vars., p. 275.
Matthiola, vars., p. 201.
Menziesia empetriformis, p. 582.
Mirabilis Jalapa, p. 760.
Modiola geranioides, p. 277.
Monarda, vars., p. 750.
Montbretia crocosmiæflora, p. 946.
Ononis rotundifolia, p. 332.
Ourisia coccinea, p. 723.
Oxalis, vars., p. 292.
Pæonia, vars., p. 165.
Papaver, vars., p. 191.
Pelargonium endlicherianum, p. 288.
Pentstemon barbatus, p. 713.
campanulatus, p. 714.
gentianoides, p. 715.
Phlox, vars., p. 658.
Phygelius capensis, p. 711.
Potentilla, vars., p. 376.
Primula cortusoides, p. 607.
japonica, p. 610.
viscosa, p. 617.
Pulmonaria, vars., p. 675.
Pyrethrum roseum, vars., p. 535.
Rhexia virginica, p. 449.
Salvia coccinea, p. 747.
splendens, p. 749.
Saponaria cæspitosa, p. 249.
calabrica, p. 249.
ocymoides, p. 250.
officinalis, p. 250.
Saxifraga biflora, p. 418.
cordifolia, p. 419.
crassifolia, p. 419.
ligulata, p. 422.
oppositifolia, p. 424.
purpurascens, p. 425.
Schizostylis coccinea, p. 943.
Sedum Ewersii, p. 439.
pulchellum, p. 439.
Sieboldi, p. 440.
spectabile, p. 441.
spurium, p. 441.
Silene Armeria, p. 251.
Elisabethæ, p. 252.
pendula, p. 253.
pennsylvanica, p. 253.
Pumilio, p. 253.
Schafta, p. 254.
virginica, p. 254.
Sparaxis pulcherrima, p. 943.
Spigelia marilandica, p. 649.
Spiræa lobata, p. 364.
palmata, p. 365.
Symphytum bohemicum, p. 674.
Tigridia Pavonia, p. 936.
Tropæolum speciosum, p. 291.
Tulipa, vars., p. 860.
Zauschneria californica, p. 452.

LIST VII

A Selection of Hardy Plants, with Blue, Bluish, or Purplish Flowers

Aconitum, vars., p. 162.
Adenophora, vars., p. 569.
Agapanthus umbellatus, p. 826.
Ageratum, vars., p. 493.
Allium azureum, p. 831.
Anchusa, vars., p. 675.
Anemone apennina, p. 140.
blanda, p. 140.
Anemone Hepatica, p. 141.
Pulsatilla, p. 143.
Aquilegia, vars., p. 155.
Aster alpinus, p. 501.
Amellus, p. 501.
lævis, p. 501.
Shortii, p. 503.
Stracheyi, p. 503.
Townshendi, p. 503.
Aster turbinellus, p. 504.
Aubrietia, vars., p. 208.
Baptisia australis, p. 323.
exaltata, p. 324.
Borago orientalis, p. 674.
Brodiæa congesta, p. 828.
grandiflora, p. 828.
laxa, p. 829.
Callistephus hortensis, p. 499.

Camassia esculenta, p. 841.
Campanula, vars., p. 562.
Catananche cærulea, p. 553.
Centaurea Cyanus, p. 550.
montana, p. 550.
Chionodoxa Luciliæ, p. 837.
„ grandiflora, p. 837.
Clematis, vars., p. 131.
Commelina cœlestis, p. 807.
Crocus, vars., p. 936.
Cyananthus lobatus, p. 560.
Delphinium, vars., p. 158.
Dracocephalum, vars., p. 751.
Echinops Ritro, p. 547.
ruthenicus, p. 547.
Edraianthus Pumilio, p. 558.
Erigeron speciosus, p. 506.
Eryngium alpinum, p. 465.
amethystinum, p. 465.
oliverianum, p. 466.
Funkia ovata, p. 817.
Galega orientalis, p. 337.
Gentiana, vars., p. 652.
Geranium armenum, p. 285.
ibericum, p. 286.
pratense, p. 286.
sylvaticum, p. 287.
Globularia, vars., p. 737.
Hepatica angulosa, p. 140.
triloba, p. 141.
Hyacinthus amethystinus, p. 836.
Hyacinthus azureus, p. 836.
Iris, vars., p. 917.
Kaulfussia amelloides, p. 498.
Linaria alpina, p. 707.
purpurea, p. 709.
Lindelofia spectabilis, p. 672.
Linum, vars., p. 282.
Lithospermum, vars., p. 678.
Lobelia, vars., p. 556.
Lupinus, vars., p. 324.
Mertensia dahurica, p. 676.
lanceolata, p. 676.
virginica, p. 676.
Mulgedium alpinum, p. 554.
Plumieri, p. 554.
Muscari, vars., p. 832.
Myosotis, vars., p. 677.
Nemophila insignis, p. 667.
Omphalodes Luciliæ, p. 672.
verna, p. 672.
Ophiopogon spicatus, p. 889.
Orobus cyaneus, p. 350.
flaccidus, p. 350.
vernus, p. 351.
Parochetus communis, p. 333.
Passiflora cærulea, p. 460.
Pentstemon azureus, p. 713.
glaber, p. 714.
Jaffrayanus, p. 715.
Phacelia, vars., p. 668.
Phyteuma, vars., p. 561.
Platycodon grandiflorum, p. 559.
Mariesi, p. 559.
Plumbago Larpentæ, p. 604.
Polemonium, vars., p. 665.
Prunella, vars., p. 754.
Pulmonaria angustifolia, p. 675.
mollis, p. 675.
sibirica, p. 676.
Puschkinia scilloides, p. 837.
Salvia azurea, p. 747.
patens, etc., p. 748.
Scilla, vars., p. 838.
Sedum cæruleum, p. 439.
Stokesia cyanea, p. 493.
Symphytum caucasicum, p. 673.
Trachelium cæruleum, p. 570.
Tradescantia virginica, p. 807.
Verbena venosa, p. 740.
Veronica, vars., p. 724.
Vicia, vars., p. 347.
Vinca, vars., p. 645.
Viola, vars., p. 228.
Whitlavia grandiflora, p. 669.

LIST VIII

A Selection of Hardy Plants with Yellow Flowers in Various Shades

Achillea ægyptiaca, p. 528.
Eupatorium, p. 528.
tomentosa, p. 529.
Aconitum Anthora, p. 162.
barbatum, p. 162.
Lycoctonium, p. 163.
Adonis vernalis, p. 144.
Allium Moly, p. 831.
Alstrœmeria aurantiaca, p. 914.
Alyssum, vars., p. 210.
Anemone palmata, p. 143.
ranunculoides, p. 143.
sulphurea, p. 140.
Anthemis tinctoria, p. 530.
Argemone mexicana, p. 193.
ochroleuca, p. 193.
Arnebia cornuta, p. 680.
echioides, p. 680.
Arnica montana, p. 539.
Asphodelus luteus, p. 823.
Baeria coronaria, p. 524.
Bartonia aurea, p. 458.
Buphthalmum grandiflorum, p. 511.
salicifolium, p. 511.
Calceolaria amplexicaulis, p. 704.
kellyana, p. 705.
Caltha palustris, p. 150.
Cassia marilandica, p. 354.
Celsia cretica, p. 702.
Centaurea babylonica, p. 549.
macrocephala, p. 550.
ragusina, p. 551.
suaveolens, p. 551.
Centauridium Drummondi, p. 496.
Cheiranthus Cheiri, p. 204.
Marshallii, p. 204.
Chelidonium majus, p. 196.
Chlora grandiflora, p. 651.
perfoliata, p. 651.
Chrysanthemum, yellow vars. p. 534.
Chrysobactron Hookeri, p. 826.
Cistus formosus, p. 226.
Coreopsis, vars., p. 518.
Coronilla Emerus, p. 345.
iberica, p. 345.
juncea, p. 345.
Corydalis in var., p. 199.
Crepis aurea, p. 553.
barbata, p. 553.
Crocosma aurea, p. 945.
Crocus in var., p. 936.
Dahlia, yellow vars., p. 519.
Delphinium Zalil, p. 162.
Dendromecon rigidum, p. 196.
Digitalis lutea, p. 723.
Dondia Epipactis, p. 467.
Doronicum, vars., p. 540.
Draba aizoides, p. 211.

- Draba Aizoon, p. 212.
  - cuspidata, p. 212.
  - tridentata, p. 213.
- Dryas Drummondi, p. 374.
- Epimedium pinnatum, p. 184.
- Eranthis hyemalis, p. 154.
- Erigeron aurantiacus, p. 506.
- Erysimum, vars., p. 214.
- Fritillaria imperialis lutea, p. 858.
- Gaillardia, vars., p. 527.
- Gazania, vars., p. 546.
- Genista, vars., p. 328.
- Geum macrophyllum, p. 375.
  - montanum, p. 375.
  - pyrenaicum, p. 375.
  - reptans, p. 375.
  - rhæticum, p. 375.
  - rivale, p. 375.
- Helenium, vars., p. 526.
- Helianthemum, vars., p. 226.
- Helianthus, vars., p. 515.
- Helichrysum arenarium, p. 508.
- Helipterum humboldtianum, p. 508.
- Hemerocallis, vars., p. 815.
- Hunnemannia fumariæfolia, p. 197.
- Hypericum, vars., p. 265.
- Inula, vars., p. 510.
- Iris flavescens, p. 922.
  - germanica, vars., p. 923.
  - Monnieri, p. 927.
  - ochroleuca, p. 927.
  - Pseudacorus, p. 929.
  - xiphioides, vars., p. 934.
  - Xiphium, p. 935.
- Kniphofia Macowani, p. 819.
- Lathyrus odoratus, vars., p. 349.
- Layia elegans, p. 523.
  - platyglossa, p. 524.
- Lilium canadense, p. 845.
  - croceum, p. 848.
  - Hansoni, p. 850.
  - monadelphum, p. 853.
  - Parryi, p. 853.
  - testaceum, p. 856.
- Limnanthemum nymphæoides, p. 658.
- Linaria vulgaris, p. 710.
- Linosyris vulgaris, p. 502.
- Linum arboreum, p. 283.
  - campanulatum, p.283.
  - flavum, p. 283.
- Lotus corniculatus, p. 335.
- Lupinus luteus, p. 325.
  - Menziesii, p. 325.
- Lysimachia lanceolatea, p. 629.
  - Nummularia, p. 629.
- Medicago falcata, p. 333.
- Narcissus, vars., p. 893.
- Nuphar luteum, p. 185.
- Œnothera, vars., p. 453.
- Onosma tauricum, p. 681.
- Orobus aurantius, p. 350.
- Papaver alpinum var., p. 191.
  - croceum, p. 191.
  - nudicaule, p. 191.
- Phlomis fruticosa, p. 757.
  - russelliana, p. 757.
- Potentilla, vars., p. 376.
- Primula Auricula, p. 606.
  - elatior, p. 608.
  - imperialis, p. 610.
  - luteola, p. 611.
  - Palinuri, p. 613.
  - sikkimensis, p. 616.
  - vulgaris, p. 617.
- Ranunculus, vars., p. 146.
- Rudbeckia, vars., p. 514.
- Sanvitalia procumbens, p. 572.
- Saxifraga Cymbalaria, p. 420.
  - sancta, p. 425.
- Sedum acre, p. 438.
  - kamtschaticum, p. 439.
- Senecio, vars., p. 540.
- Silphium, vars., p. 511.
- Solidago, vars., p. 496.
- Sphenogyne speciosa, p. 544.
- Statice Bonduelli, p. 602.
  - Fortunei, p. 602.
- Sternbergia, vars., p. 908.
- Tagetes, vars., p. 525.
- Thermopsis fabacea, p. 323.
  - lanceolata, p. 323.
- Trollius, vars., p. 151.
- Tropæolum peregrinum, p. 291.
  - polyphyllum, p. 291.
- Tulipa, vars., p. 864.
- Venidium calendulaceum, p. 545.
- Verbascum Chaixii, p. 702.
  - phlomoides, p. 702.
- Vesicaria, vars., p. 209.
- Viola pubescens, p. 231.
  - tricolor, vars., p. 234.
- Waitzia aurea, p. 507.
- Waldsteinia fragarioides, p. 376.
  - geoides, p. 376.
  - trifolia, p. 376.
- Zinnia, vars., p. 512.

LIST IX

Plants that flower between September and May. The Dates are approximate only. For Trees and Shrubs see p. 107.

September and October

- Abronia umbellata, p. 760.
- Aconitum japonicum, p. 163.
- Alyssum maritimum, p. 210.
- Amaryllis Belladonna, p. 912.
- Ammobium alatum, p. 509.
- Anemone japonica, p. 142.
- Aster, vars., p. 501.
- Bulbocodium autumnale, p. 877.
- Calandrinia Menziesi, p. 262.
  - umbellata, p. 262.
- Callistephus hortensis, p. 499.
- Chrysanthemum, vars., p. 531.
- Colchicum autumnale, p. 876.
  - speciosum, p. 876.
  - variegatum, p. 876.
- Coreopsis, vars., p. 518.
- Cosmos bipinnatus, p. 522.
- Dahlia, vars., p. 519.
- Erianthus Ravennæ, p. 960.
- Erigeron aurantiacus, p. 506.
- Gaillardia, vars., p. 527.
- Gazania, vars., p. 546.
- Gladiolus, vars., p. 947.
- Gynerium argenteum, p. 960.
- Gypsophila elegans, p. 248.
- Heuchera sanguinea, p. 427.
- Lobelia fulgens, p. 557.
- Lychnis haageana, p. 257.
- Montbretia crocosmiæflora, p. 946.
- Œnothera, vars., p. 453.

- Pentstemon, vars., p. 712.
- Phlox, vars., p. 658.
- Phygelius capensis, p. 711.
- Pyrethrum Parthenium fl. pl. p. 536.
    - vars., p. 536.
- Rudbeckia, vars., p. 514.
- Saponaria calabrica, p. 250.
- Sternbergia, vars., p. 908.
- Tagetes, vars., p. 525.
- Tritoma, vars., p. 817.
- Venidium calendulaceum, p. 545.
- Verbena, vars., p. 740.
- Zauschneria californica, p. 452.
- Zinnia, vars., p. 512.

November to January

- Colchicum autumnale, p. 876.
- Cyclamen, vars., p. 626.
- Galanthus nivalis, p. 906.
- Helleborus niger, p. 153.
- Iris stylosa, p. 933.
- Petasites fragrans, p. 539.
- Viola, p. 228.

February and March

- Anemone angulosa, p. 140.
    - apennina, p. 140.
    - Hepatica, p. 142.
- Aubrietia deltoidea, p. 209.
- Bulbocodium vernum, p. 877.
- Cheiranthus, p. 204.
- Chionodoxa Luciliæ, p. 837.
- Eranthis hyemalis, p. 154.
- Erica mediterranea, p. 581.
- Galanthus, p. 906.
- Helleborus, p. 152.
- Iris persica, p. 928.
- Leucojum vernum, p. 908.
- Narcissus, vars., p. 893.
- Scilla sibirica, p. 840.
- Viola, p. 228.

April

- Adonis vernalis, p. 144.
- Æthionema grandiflorum, p. 217.
- Anemone fulgens, p. 141.
- Aquilegia cærulea, p. 156.
- Auricula, p. 618.
- Caltha palustris, p. 150.
- Centaurea montana, p. 250.
- Convallaria majalis, p. 813.
- Dielytra spectabilis, p. 199.
- Doronicum, vars., p. 540.
- Fritillaria imperialis, p. 858.
- Gentiana, vars., p. 652.
- Hoteia japonica, p. 414.
- Kaulfussia amelloides, p. 498.
- Pæonia, vars., p. 165.
- Primroses, p. 604.
- Reineckia carnea, p. 814.
- Tulips, p. 860.

LIST X

A Selection of the finest Hardy Bulbous and Rhizomatous Plants for the Outdoor Garden. Most of these belong to the Orders Amaryllideæ (p. 893*), Liliaceæ (p.* 808*), and Irideæ (p.* 916*), but a few to other Orders.*

- Acis autumnalis, p. 908.
- Agapanthus umbellatus, p. 826.
- Allium, vars., p. 830.
- Alstrœmeria, vars., p. 914.
- Amaryllis Belladonna, p. 912.
- Anomatheca cruenta, p. 944.
- Anthericum, p. 825.
- Antholyza, vars., p. 914.
- Arum crinitum, p. 953.
    - Dracunculus, p. 954.
    - italicum, p. 954.
- Asphodelus, vars., p. 822.
- Brodiæa coccinea, p. 827.
    - congesta, p. 828.
    - grandiflora, p. 828.
- Bulbocodium vernum, p. 877.
- Calla palustris, p. 955.
- Calliprora lutea, p. 829.
- Calochortus, vars., p. 872.
- Calopogon, p. 891.
- Calypso borealis, p. 890.
- Camassia, p. 841.
- Chionodoxa, p. 891.
- Colchicum, vars., p. 875.
- Crinum, p. 911.
- Crocosma aurea, p. 945.
- Crocus, vars., p. 936.
- Cypripedium acaule, p. 892.
    - Calceolus, p. 892.
    - guttatum, p. 892.
    - spectabile, p. 893.
- Eremurus, vars., p. 824.
- Erythronium, vars., p. 869.
- Fritillaria, vars., p. 857.
- Funkia, vars., p. 816.
- Galanthus, vars., p. 906.
- Galtonia, vars., p. 831.
- Gladiolus, vars., p. 947.
- Hemerocallis, vars., p. 815.
- Hippeastrum, p. 910.
- Hyacinthus, vars., p. 833.
- Iris, vars., p. 917.
- Ixiolirion, p. 913.
- Kniphofia, vars., p. 817.
- Leucojum æstivum, p. 908.
    - vernum, p. 908.
- Lilium, vars., p. 842.
- Lycoris, p. 912.
- Merendera Bulbocodium, p. 877.
- Montbretia crocosmiæflora, p. 946.
- Muscari, vars., p. 832.
- Narcissus, vars., p. 893.
- Ophrys, vars., p. 892.
- Orchis, vars., p. 891.
- Ornithogalum, vars., p. 842.
- Polianthes tuberosa, p. 915.
- Polygonatum, vars., p. 811.
- Puschkinia scilloides, p. 837.
- Richardia africana, p. 955.
- Schizostylis coccinea, p. 943.
- Scilla, vars., p. 838.
- Sisyrinchium, vars., p. 943.
- Sparaxis pulcherrima, p. 943.
- Sprekelia, p. 910.
- Sternbergia lutea, p. 909.
- Tigridia Pavonia, p. 936.
- Tricyrtis hirta, p. 879.
- Trillium grandiflorum, p. 880.
- Triteleia uniflora, p. 830.
- Tritoma, vars., p. 817.
- Tritonia, p. 946.
- Tulipa, vars., p. 860.
- Watsonia, vars., p. 945.
- Xerophyllum, p. 878.
- Zephyranthes Atamasco, p. 909.
    - candida, p. 910.

THE ROCK GARDEN

This is one of the most important and picturesque features in the modern flower garden. Although many of the plants recommended for the Rock Garden will grow perfectly well in the flat flower border, still they appear in a different light and often to better advantage when cultivated among the plants usually associated with alpine heights.

The rockery is an attempt to imitate nature on a small scale by arranging masses or boulders of rock and earth more or less artistically and growing upon them, or between the chinks, plants usually found at high elevations on the mountains of Europe and other parts of the globe. It is only within the last twenty-five or thirty years that the formation of beautiful rockeries has been seriously taken in hand. Before that time all kinds of material did duty for a rockery, but usually not the slightest attempt at copying nature or studying the interests of the plants was made. And it was not until Mr. Robinson, in his valuable little book dealing with 'Alpine Plants,' opened the eyes of the public to a better and more rational method of building rockeries and growing alpine plants upon them, that anything like a good rock garden was to be found in the kingdom. Now there are many good and several bad ones, but as the light is spreading we may hope to see the latter dwindling in number every year.

Formation of a Rock Garden.—The Rev. C. Wolley-Dod, of Edge Hall, Malpas, Cheshire, who has for very many years been an expert cultivator of all kinds of hardy herbaceous and alpine plants, writing about the formation of a rockery a few years ago in the Royal Horticultural Society's 'Journal,' made the following observations, which deserve every attention :—

'The forms in which the rockery, usually so called, can be constructed may be divided into three: (1) the "barrow-shaped" rockery, (2) the "facing rockery," and (3) the "sunk rockery." The first may be raised anywhere, the other two depend partly upon the configuration of the ground. No wood or tree roots should be used to supplement any of them; they must be all stone. The kind of stone is seldom a matter of choice; everyone will use what is most handy. The rougher and more unshapely the blocks the better. The size should vary from 40 to 50 lbs. to 3 or 4 cwt. No mortar or cement for fixing them together must ever be employed; they must be firmly wedged and interlocked, and depend upon one another, and not upon the soil between them, to keep them in their places. This rule is of the utmost importance; if it is neglected, a long frost or an excessive rainfall may cause the whole structure to collapse. Each successive part of the stone skeleton must be put together before the soil is added. This applies to all rockeries.

'**Size, Aspect, &c.**—The most convenient size for the barrow-shaped rockery is about 4 ft. high, and 6 or 7 ft. through at the base. The length is immaterial. If the long sides face north-east and south-west it will afford perhaps the best variety of aspect; but the amount of sunshine each plant gets will depend on the arrangement of each stone as much as upon the main structure.

'There cannot be too many projections, and care must be taken to leave no channels between the stones by which the soil can be washed down to the base. Overhanging brows beneath which plants can be inserted are very useful; large surfaces of stone may here and there be left exposed, and irregularity of form is far better than symmetry. A formal arrangement of flat pockets or nests offends the eye without helping the cultivator, as the tastes of alpine plants as regards slope of surface and moisture at their roots are very various.

'As for the degree of slope from base to the summit of the barrow, it will not be uniform. In some places there will be an irregular square yard of level on the top, bounded by large cross key-stones, for which the largest stones should be reserved. In other parts the sides will slope evenly to the ridge; or the upper half may be perpendicular, leaving only wide crevices to suit the taste of certain plants.

'If the blocks are very irregular in form, and their points of contact as few as possible, providing only for secure interlocking, there will be plenty of room for soil to nourish the plants. Ever-changing variety of stone surface, both above and below the soil, is the object to be aimed at, and any sort of symmetry must be avoided.

'**The "Facing Rockery."**—The second form, or "facing rockery," is dependent upon the natural shape of the ground surface. Wherever there is a steep bank facing south or east, it may be utilised for the growth of alpine plants. The stones, as before advised, should be large and unshapely, and be buried to-two thirds of their bulk, and form a very uneven surface, all being interlocked from top to bottom as described.

'Rockeries of this form are less liable to suffer from drought; if the surface covered is large, access to all parts should be provided by convenient stepping stones, because, although every stone in the structure ought to be capable of bearing the weight of a heavy man without danger of displacement, it is better not to have to tread upon the plants.

'**The "Sunk Rockery."**—This is perhaps the best of all, but entails rather more labour in construction. Where subsoil drainage is perfect, a sunk walk may be made, not less than 10 to 12 feet wide, with sloping sides. The sides may be faced with stones, as described in the "faced rockery," and all or part of the excavated soil may be made into a raised mound, continuing the slopes of the excavated banks, above the ground level, and thus combining the facing rockery and the barrow rockery.

'If the outer line of this portion above the ground be varied by small bays, every possible aspect and slope may be provided to suit the taste of every plant. However, unless drainage is perfect, a sunk walk, rising to the ground-level at each end, would not be feasible. But a broad walk, excavated into the side of a hill and sloping all one way, could be adapted to a structure nearly similar to that described; or the ground may be dug out in the form of an amphitheatre to suit the taste or circumstances.

'But whatever the form of the rockery adopted, let the situation be away from the influence of trees, beyond suspicion of the reach of their roots below, or their drip, or even their shade, above. Trees which shelter from only high winds are so far serviceable, and so are walls and high banks. There are few alpine plants for which a storm-swept surface is good, but trees are objectionable where they lessen the light, which is an important element in the welfare of most mountain plants. The shade and shelter afforded by the stones and form of the structure itself is the best kind of shade and shelter.

'**Soil for Alpine and Rock Plants.**—We now come to the subject of soil, which is very important, though I attach less importance to it than others do who have written on the subject. I hold that where atmospheric and mechanical conditions are favourable, the chemical combination of the soil is of secondary consideration.

'It is true that in nature we find that the flora of a limestone mountain differs in many particulars from that of a granite mountain, and on the same mountain some plants will thrive in heavy retentive soil, while others will be found exclusively in peat or sand. But for one who is beginning to cultivate alpine plants to have to divide them into lime-lovers and lime-haters, lovers of sand and lovers of stiff soil, is an unnecessary aggravation of difficulties.

'So large a proportion of ornamental plants are contented with the soil which most cultivators provide for all alike—even though in nature they seem to have predilections—that where an amateur has only one rockery it would be too perplexing to study the partiality of every plant, and to remember every spot where lime-lovers or their opposites had been growing. While saying this, I confess that I have some rockeries where both soil and rock are adapted exclusively for lime plants; others from which lime is kept away, and where both soil and rock are granitic; but the great majority of plants thrive equally well on both. . . .

'With regard to soil, then, we must take care that it does not retain stagnant moisture and yet it must not dry up too readily. Plants must be able to penetrate it easily with their roots, the lengths of some of which must be seen to be believed. Good loam, with a little humus in the form of leaf-mould or peat, and half or three-quarters of the bulk composed of stone riddlings from the nearest stone quarry, and varying in size from that of rape seed to that of horse beans, make up a soil with which most alpine plants are quite contented. . . .

'Where you are convinced that lime is useful, it may be added as pure lime, not planting in it till thoroughly slaked by mixture with the soil. Rough surface dressing is a thing in which all alpine plants delight, as it keeps the top of the soil sweet and moist and prevents their leaves being fouled. Use for this purpose riddled stone, which is better than gravel, as round pebbles are easily washed off the slope by rain or in watering.

'**Raising Alpine Plants from Seed.**—A few words may be in place here about raising alpine plants from seed; for constant succession is necessary, the duration of their life in cultivation being, for many obvious reasons, far shorter than in their native home. Reproduction from seed, where seed can be obtained, ensures the healthiest and finest growth; and there is no better way of getting seed than saving it yourself.

'In several cases the first hint I have had that a plant has ripened fertile seed has been the recognition of a seedling near the parent; and this experience has taught me always to look carefully for seed after the flowering of rare specimens.

'I need not say, therefore, that I disapprove of the practice of cutting off flower-heads as soon as they wither; in some cases the seed-head is nearly as ornamental as the flower; but I have before said that discretion must be used even in this, as seedlings of some things are troublesome from their number.

'When ripe seed is gathered I recommend its being sown at once. It is then more likely to come up quickly; and as all such plants as we grow on rockeries are better sown in pans, there is seldom difficulty in keeping small seedlings through the winter. The greatest enemy we have in the process is the growth of Lichen, the worst being the Marchantia or Liverwort, which completely chokes tender growth.

A coating of finely sifted burnt earth on the surface, and a piece of glass laid over the pan, especially if no water is used for them unless it has been boiled, reduces this trouble to a minimum. But sowings of choice and rare seed should be carefully watched, and the Liverwort picked off at the first appearance.

'**Division and Cutting.**—Many alpines seem never to ripen seed in cultivation, and must be reproduced by division or cuttings. The skill required to do this varies greatly with different subjects: where a shoot can seldom be found more than half an inch long, as in the case of two or three hybrid alpine Pinks, the "striking" needs delicate manipulation. Other things grow very slowly, though not long-lived, and a constant succession from cuttings must be ensured. Some of the terrestrial Orchids—such as Bee, Fly, and Spider, excellent subjects for rockery—we must be contented to keep as long as they choose to live, as they never seem to increase in cultivation at all, though they may flower well year after year.

'But there are not a few plants which refuse to be tamed, and from the time they are planted in our gardens seem always to go from bad to worse, and are never presentable in appearance for two seasons together. Of these I may instance *Gentiana bavarica* (p. 653) and *Eritrichium nanum* (p. 673), which I believe no skill has ever kept in cultivation without constant renewal, and which perhaps are never likely to repay the trouble of trying to keep them alive on an English rockery. In all alpine gardening there will be (even where equal skill is exerted) different degrees of success according to the surrounding conditions, and it must not be expected that the same soil and treatment which keeps a hundred rare alpines in perfect health at Edinburgh will be equally fortunate at Kew.

'**Cold Frames.**—Where the area of rockery is considerable a cold frame (see p. 47) should be assigned for keeping up the supply of plants for it—cuttings and seedlings—in pots. The best treatment of these plants in winter has been much discussed in gardening journals. I may say that I think all attempts to imitate natural conditions, such as snow and long rest, by unnatural means are mistakes. During warm winters, mountain plants will grow and must be allowed to grow, and to keep them unnaturally dark or drying when growing is fatal to their health. Even in severe frosts air must be given abundantly in the daytime and the frames must not be muffled up. Stagnant air, whether damp or dry, is their worst enemy; but if the weather is warm enough to set them growing, they may easily die for want of moisture. I will not say more than this, for experience is the best guide, and every one thinks he can manage his frames better than his neighbour; but of the use of frames for flowering alpines in pots I must add a few words.

'There are certain very early flowering alpines upon which a mixture of admiration and lamentation is bestowed at the end of every winter. Their flowers are often beautiful in a treacherous fortnight at the beginning of February, and are suddenly destroyed by a return of winter in its severest form. I may mention, among others, *Saxifraga burseriana* and *sancta*, and their near relatives and hybrids, *Primula marginata* and *intermedia*, *Androsace carnea*, *Chamæjasme*, and *Laggeri*, several dwarf species of Alyssum and Iberis, and there are a good many more. Pots or pans containing these may be grouped together in an open sunny spot, and plunged in sand or coal-ashes, in a rough frame made for them, so that the lights may be not more than three or four inches above the pots. These lights should be removed in the daytime when the weather is fine, and air should be admitted, according to the temperature, at night. Such a sheet of elegant beauty, lasting, if well ranged, through February, March, and April, may be obtained in this way that I often wonder why amateurs attempt to flower early alpines in any other fashion.

'With me April is the earliest month in which I can expect to have anything gay on the open rockery without disappointment. I am obliged to disfigure the slopes with sheets of glass and handlights to preserve through winter at all *Omphalodes Luciliæ*, *Onosma tauricum*, *Androsace sarmentosa*, and others which cannot endure winter wet, and the real pleasure of the rockery begins when the frame alpines are waning. I recommend those masses of covered pots in early spring to all cultivators of alpines.

'**Alpines on Walls.**—A few years ago I was driving through Dorking, and I noticed a smooth and by no means ancient brick wall covered, above the reach of boys' hands, with *Erinus alpinus*. Rough stone walls I had often seen well clothed with alpines, but from that time I became aware that there is hardly any garden wall, of whatever material, of which the parts otherwise bare might not be made ornamental with flowers. I do not suggest that such things should supersede climbing Roses and wall-fruit, but how often we see bare walls on which nothing is grown at all! The capabilities of rough stone walls for growing mountain plants are very great. Falls of Aubrietia and Iberis, groups of Saxifrage, and similar subjects may make many a corner gay instead of bare. Some very pretty things I grow on walls which have defied all my attempts to cultivate them elsewhere. I may specify *Lychnis Lagascæ*, a fragile evergreen plant of shrubby growth, easily multiplied by seed, which alternate snows and thaws generally crush up, but in this way it continues to thrive, and is covered during early summer with crimson flowers.'

LIST XI

Selection of Alpine and other Plants suitable for the Rock Garden

Those marked with an asterisk (*) make suitable carpets or masses of green on the surface of the soil.

- *Acæna microphylla, p. 381.
- Acantholimon glumaceum, p. 601.
- *Achillea, vars., p. 528.
- Aconitum Napellus, p. 163.
- Actæa spicata, p. 164.
- Æthionema, vars., p. 216.
- *Alchemilla alpina, p. 381.
- Alyssum maritimum, p. 210.
    - montanum, p. 210.
    - pyrenaicum, p. 211.
    - saxatile, p. 211.
    - serpyllifolium, p. 211.
    - spinosum, p. 211.
- Andromeda, p. 578.
- Androsace, vars., p. 621.
- Anemone, vars., p. 139.
- *Antennaria, vars., p. 507.
- Anthemis Aizoon, p. 530.
- Anthyllis montana, p. 334.
- Antirrhinum, vars., p. 710.
- Aquilegia pyrenaica, p. 157.
- *Arabis albida, p. 205.
    - androsacea, p. 206.
    - mollis, p. 206.
    - procurrens, p. 206.
    - rosea, p. 206.
- Aralia, vars., p. 469.
- *Arenaria, vars., p. 259.
- Armeria, vars., p. 603.
- Arnebia echioides, p. 680.
- Artemisia frigida, p. 538.
- Arundo Donax, p. 958.
- Asperula odorata, p. 487.
- Aster alpinus, p. 501.
- Astragalus monspessulanus, p. 343.
- *Aubrietia, vars., p. 208.
- Azalea sinensis, p. 595.
- Bambusa, dwarf kinds, p. 968.
- Bellis cærulescens, p. 498.
- Berberis Darwini, p. 181.
    - empetrifolia, p. 181.
    - stenophylla, p. 182.
- Bulbocodium, p. 877.
- Buxus, vars., p. 783.
- Calandrinia umbellata, p. 262.
- Callirhoë involucrata, p. 276.
    - pedata, p. 276.
- Calystegia dahurica, p. 684.
    - pubescens pl., p. 684.
- Campanula abietina, p. 563.
    - Allioni, p. 563.
    - cæspitosa, p. 563.
    - „ alba, p. 563.
    - Elatines, p. 564.
    - fragilis, p. 564.
    - garganica, p. 564.
    - isophylla, p. 565.
    - Mariesii, p. 559.
    - portenschlagiana, p. 567.
    - pulla, p. 567.
    - Raineri, p. 567.
    - rotundifolia, p. 568.
    - waldensteiniana, p. 569.
    - &c. &c.
- Cerastium Biebersteini, p. 258.
    - grandiflorum, p. 258.
    - tomentosum, p. 259.
- Chimaphila, vars., p. 598.
- Choisya ternata, p. 296.
- Clematis (the new varieties of the lanuginosa section, and many species), p. 131.
- Colchicum, vars., p. 875.
- Convolvulus arvensis, p. 685.
    - mauritanicus, p. 685.
- Cornus canadensis, p. 474.
- Coronilla iberica, p. 345.
    - varia, p. 345.
- Cotoneaster horizontalis, p. 410.
    - integerrima, p. 410.
    - microphylla, p. 411.
    - thymifolia, p. 411.
- Cratægus Lalandi, p. 409.
- Crocus, vars., p. 936.
- Cyananthus lobatus, p. 560.
- Cyclamen, vars., p. 626.
- Cypripedium, vars., p. 892.
- Cytisus kewensis, p. 331.
- Cytisus purpureus, p. 332.
- Daphne blagayana, p. 777.
    - Cneorum, p. 778.
    - fioniana, p. 778.
    - rupestris p. 778.
- *Dianthus alpinus, p. 239.
    - cæsius, p. 239.
    - deltoides, p. 244.
    - Knappi, p. 245.
    - neglectus, p. 245.
    - petræus, p. 245.
    - &c. &c.
- Diotis maritima, p. 530.
- Diplopappus chrysophyllus, p. 509.
- *Draba, vars., p. 211.
- Dracocephalum, vars., p. 751.
- Dryas Drummondi, p. 374.
    - octopetala, p. 374.
- Edraianthus tenuifolius, p. 559.
- Empetrum nigrum, p. 805.
- Epigæa repens, p. 578.
- Epilobium obcordatum, p. 452.
- Erica, vars., p. 580.
- Erinus alpinus, p. 723.
- Erodium, vars., p. 287.
- Erpetion, vars., p. 229.
- Erythræa diffusa, p. 651.
- Erythronium, vars., p. 869.
- Euonymus radicans var., p. 302.
- Euphorbia Myrsinites, p. 783.
- Fragaria indica, p. 376.
- Fritillaria, dwarf vars., p. 857.
- Galanthus, vars., p. 906.
- Gaultheria, vars., p. 575.
- Genista andreana, p. 332.
    - germanica, p. 329.
    - pilosa, p. 329.
    - sagittalis, p. 329.
    - tinctoria, p. 329.
- Gentiana, vars., p. 652.
- *Geranium argenteum, p. 285.
    - *cinereum, p. 286.
    - subcaulescens, p. 285.
- Geum miniatum, p. 374.
- Globularia, vars., p. 738.

- *Gypsophila cerastioides, p. 248.
  - repens, p. 249.
- Haberlea rhodopensis, p. 731.
- Hedera, vars., p. 471.
- Helianthemum, vars., p. 226.
- Helleborus, vars., p. 152.
- *Herniaria glabra, p. 761.
- *Heuchera sanguinea, p. 427.
- Hippocrepis comosa, p. 345.
- Houstonia cærulea, p. 487.
- *Hutchinsia alpina, p. 220.
- Hypericum *Coris, p. 266.
  - japonicum, p. 266.
  - moserianum, p. 266.
  - nummularium, p. 267.
  - perforatum, p. 267.
- Iberis petræa, p. 219.
  - Pruiti, p. 219.
  - saxatilis, p. 219.
- Isopyrum thalictroides, p. 154.
- Jamesia americana, p. 434.
- Lathyrus grandiflorus, p. 348.
  - latifolius, p. 348.
  - ,, albus, p. 348.
  - tuberosus, p. 350.
- Ledum thymifolium, p. 585.
- Leontopodium alpinum, p. 507.
- Ligustrum coriaceum, p. 643.
- Linaria alpina, p. 707.
  - anticaria, p. 707.
  - Cymbalaria, p. 708.
  - hepaticæfolia, p. 708.
- Linnæa borealis, p. 482.
- Linum alpinum, p. 283.
- Lithospermum Gastoni, p. 678.
  - graminifolium, p. 679.
  - petræum, p. 679.
- Lithospermum prostratum, p. 679.
- Lotus corniculatus, p. 335.
- Lychnis alpina, p. 255.
  - Lagascæ, p. 257.
- Lysimachia nemorum, p. 629.
  - Nummularia, p. 629.
- Malva campanulata, p. 276.
- Margyricarpus setosus, p. 381.
- Meconopsis, vars., p. 193.
- Medicago falcata, p. 333.
- Micromeria Piperella, p. 745.
- Muehlenbeckia complexa, p. 771
- Myosotis rupicola, p. 677.
- Narcissus, vars., p. 893.
- Nepeta Glechoma, p. 750.
  - variegata, p. 750.
- Nierembergia rivularis, p. 698.
- Œnothera missouriensis, p. 454.
  - taraxacifolia, p. 454.
- Olearia Haasti, p. 504.
- Omphalodes Luciliæ, p. 672.
  - verna, p. 672.
- Ononis fruticosa, p. 332.
  - Natrix, p. 332.
- Onosma tauricum, p. 681.
- Orchis, vars., p. 891.
- Orobus, vars., p. 350.
- Oxytropis Halleri, p. 344.
  - montana, p. 344.
  - pyrenaica, p. 344.
- Paronychia serpyllifolia, p. 761.
- Pentstemon, vars., p. 712.
- Pernettya, vars., p. 575.
- Petrocallis pyrenaica, p. 212.
- Philadelphus microphyllus, p. 433.
- Phlox amœna, p. 660.
  - divaricata, p. 660.
  - reptans, p. 661.
- Phlox Stellaria, p. 661.
  - subulata, p. 662.
- Plumbago Larpentæ, p. 604.
- Polemonium, vars., p. 665.
- Polygala Chamæbuxus, p. 237.
- Polygonum Bistorta, p. 768.
  - vaccinifolium, p. 770.
- Potentilla alpestris, p. 377.
  - Calabra, p. 378.
  - hopwoodiana, p. 379.
  - nitida, p. 380.
- Primula, vars., p. 604.
- Ramondia pyrenaica, p. 730.
- Ranunculus, vars., p. 146.
- Rhododendron, vars., p. 585.
- Rhus cotinus, p. 319.
- Rodgersia podophylla, p. 415.
- Rosa, vars., p. 382.
- Rubus arcticus, p. 372.
- Salix, vars., p. 802.
- Samolus repens, p. 632.
- Sanguinaria canadensis, p. 195.
- Santolina Chamæcyparissus, p. 529.
- Saponaria ocymoides, p. 250.
- *Saxifraga, dwarf vars., p. 415.
- Schizocodon soldanelloides, p. 600.
- Scilla, vars., p. 838.
- *Sedum, vars., p. 438.
- Sempervivum, vars., p. 441.
- Spiræa, vars., p. 363.
- Thalictrum, vars., p. 137.
- *Thymus, vars., p. 745.
- *Tiarella cordifolia, p. 426.
- Trillium grandiflorum, p. 880.
- Triteleia uniflora, p. 830.
- Tulipa, vars., p. 860.
- Tunica Saxifraga, p. 247.
- Vaccinium, vars., p. 572.
- Veronica, dwarf vars., p. 724.
- Viola, vars., p. 228.

ORNAMENTAL AND FLOWERING TREES AND SHRUBS

ONE can hardly imagine a garden of any size which does not contain a flowering or ornamental tree or shrub of some kind or another. And yet until comparatively recent years the cultivation of this particular class of plants was more or less neglected, while a vast amount of time and labour was spent on that gaudy and ephemeral work known as 'carpet-bedding.' Fortunately, a more rational and natural view of plants in general is now taken, and there is no part of a garden which is not eminently suitable for the cultivation of some plant or another, either native or exotic, and whether tree, shrub or herb.

In the British Islands we are of course confined to the cultivation of those kinds of trees and shrubs which are natives of temperate climates like our own, but a perusal of the list given below will show that there are already a very considerable number which can be grown successfully in various parts of the kingdom. They come from all parts of the world, from China and Japan, North and South America, Europe, Asia and New Zealand, and with few exceptions they adapt themselves to our climate with the greatest ease. A visit to Kew Gardens at any season of the year will give some idea of the great beauty and variety of the trees and shrubs which may be used to beautify the landscape.

Planting for Effect.—The arguments used in favour of massing herbaceous plants in borders apply with equal force to the planting of flowering shrubs, but not to large trees. The latter, on account of their size, are best planted in advantageous positions so that they will give the best possible effect to the landscape. Shrubs, on the other hand, which grow from two or three to ten or twelve feet high—like Dogwoods, Forsythias, Cotoneasters, Diervillas, Mock Orange, Viburnums, Andromedas, Azaleas, Rhododendrons, Barberries, Ceanothus, Dabœcia, Deutzias, Ericas, Spiræas &c.—may be grown in masses on the lawn, in the pleasure ground, or wilder parts of the garden.

In what is usually called the 'shrubbery' many choice shrubs are spoiled and distorted by being crammed in anyhow, as if the chief object of the planter was to hide the ground altogether, and prevent any chance of the plant's natural development. They are pushed away in holes and corners under large overhanging trees, and often smothered with the vigorous-growing Snowberry (p. 481), and when by chance they survive, they only manage to stretch forth a lean and almost leafless branch to obtain a little sunshine.

Even in shrubberies, plants would look much better in groups or masses not too close together; and as much thought and attention should be given to the soil and position in which they are placed as one would bestow on choice fruit trees, Roses, or rock-plants.

Planting.—Trees and shrubs are usually best planted in the autumn when the sap is in a more or less quiescent state. Many, however, which do not begin to grow until the usual time in spring may be planted up to the end of February. Mild open weather should always be chosen for performing the work, and the soil should be in a dryish and easily workable condition. If the ground is covered with frost or snow, the work is best suspended until a more favourable opportunity presents itself. The actual planting itself should be done as carefully as if a fruit tree were being placed in the soil. The operation is explained at p. 1032, to which the reader is invited to turn.

Pruning and Training Ornamental Trees.—If there were no more trouble taken over the pruning and training of fruit trees than is usually taken over that of flowering trees and shrubs, the fruit garden would not only very soon present a neglected appearance but also show a big falling off in the returns of the fruit crops. All our Apples, Pears, Plums, Cherries &c. are more or less regularly attended to in the matter of training, pruning, thinning out &c.; but their cousins, which are valued chiefly for their beautiful flowers and ornamental appearance, are often left to look after themselves, sometimes maybe for years, until they almost cry out for some little attention to be given them.

Matters, however, in this respect are gradually becoming better, and trees and shrubs, other than those grown for their fruits, are receiving a proper share of attention in the way of training and pruning. The chief principles of pruning are the same as detailed for fruit trees at p. 1031. There is, however, far more variety in trees and shrubs, and the gardener should exercise his intelligence when dealing with any particular species. Its nature may be readily gleaned from its relation to others with which he may be well acquainted. Being arranged in botanical families in this book, that will still further aid him in his practical work. For instance, all the Hawthorns (Cratægus, p. 408), Almonds (Prunus, p. 356) &c. in the main follow the same principles of growth as other trees in the Rose Order (p. 355), such as Apples, Pears, Plums, Cherries &c., and require almost the same kind of pruning—due attention being given to the special peculiarities of any particular species.

As a general rule the main point is to keep up a good supply of the younger wood, and gradually cut away the old and useless branches. On the branches that are left there are usually two kinds of buds, some plumper than the others, and these are generally the ones that produce the flowers. As the proper time for pruning is mentioned under each class of plants described it is unnecessary to discuss the matter further here.

The way in which cuts are to be made when pruning fruit trees is explained and illustrated at p. 1033. It will be noticed, however, that the buds on most of the branches are arranged not exactly opposite each other, but usually in an alternate manner so that there is little danger of injury to the buds when making a cut. In some trees, however, like the Lilac (fig. 134), the Ash (fig. 135), Forsythias, and many others, the buds are usually arranged opposite each other as shown in the sketches. In such cases, when pruning, the branch should be cut where the buds or joints are not situated exactly opposite each other. In fig. 135 of the Ash taken from nature the thin transverse lines show where a shoot may be cut across so as to leave the bud immediately beneath the cut to develop and carry on a branch almost in line with that below it, and thus add to the symmetry of the tree.

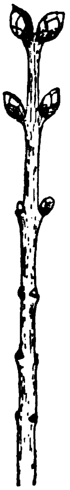
FIG. 134. LILAC.

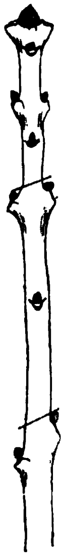
FIG. 135. ASH.

The following is a list of the best trees and shrubs worth growing in the open air either for their beautiful flowering qualities, or their ornamental appearance. The generic name only is given, as the species follow in alphabetical order at the pages indicated.

It often happens that a list of ornamental trees and shrubs that bloom at any particular period of the year is required, and to supply this want an asterisk (*) has been placed after the names in the list to show the months when plants belonging to any particular genus may be found in blossom. As might be naturally expected, there are a very large number of trees and shrubs in bloom during April, May, June, and July, but it will also be seen that every month in the year has some particular plant in blossom. By means of the list, therefore, it will be possible to make a selection so as to have flowers in the border or shrubbery all the year round. It may be noted that species are not mentioned, but a reference to the page given after each genus will enable the reader to find what species belonging to it bloom during the months under which an asterisk appears.

It may also be remarked that many trees and shrubs are more remarkable for their beautiful bright coloured berries, rather than their blossoms, such as Aucubas, Euonymus, Pernettyas, Sea-Buckthorn, Skimmias, while many others are remarkable for both flowers and fruit, such as the Cherries, Cotoneasters, Barberries, Hawthorns, Medlars, Roses, Viburnums &c. An obelisk (†) has been placed in front of those genera which are remarkable for their beautiful fruits as well as flowers.

LIST XII

Ornamental and Flowering Trees and Shrubs

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Abelia, p. 481	—	—	*	*	—	—	—	*	*	—	—	—
Acanthopanax, p. 470	—	—	—	—	—	—	*	*	—	—	—	—
Acer, p. 313	—	—	—	*	*	—	—	—	—	—	—	—
Actinidia, p. 267	—	—	—	—	—	*	*	—	—	—	—	—
Adenocarpus, p. 327	—	—	—	*	*	*	—	—	—	—	—	—
Æsculus, p. 311	—	—	—	*	*	*	*	—	—	—	—	—
Ailanthus, p. 299	—	—	—	—	—	—	*	*	—	—	—	—
Akebia, p. 179	—	—	—	*	*	—	—	—	—	—	—	—
†Alnus, p. 796	—	—	*	*	—	—	—	—	—	—	—	—
†Amelanchier, p. 418	—	—	—	*	*	—	—	—	—	—	—	—
Amorpha, p. 336	—	—	—	—	—	*	*	—	—	—	—	—
Amygdalus, p. 357	—	*	*	*	—	—	—	—	—	—	—	—
Andromeda, p. 578	—	—	*	*	*	*	—	—	—	—	—	—
Aralia, p. 469	—	—	—	—	—	—	*	*	*	—	—	—
†Arbutus, p. 574	—	—	*	*	—	—	—	—	*	*	*	*
Arundinaria, p. 965	—	—	—	—	—	—	—	—	—	—	—	—
Asimina, p. 177	—	—	—	*	*	—	—	—	—	—	—	—
Aucuba, p. 475	*	*	—	—	—	—	—	—	—	—	—	*
Azalea, p. 593	—	—	*	*	*	*	—	—	—	—	—	—
Azara, p. 235	—	—	—	—	—	*	*	*	*	—	—	—
Bambusa, p. 968	—	—	—	—	—	—	—	—	—	—	—	—
Benthamia, p. 474	—	—	—	—	—	*	*	*	*	*	—	—
Berberidopsis, p. 180	—	—	—	—	—	*	*	*	*	*	—	—
†Berberis, p. 180	*	*	*	*	*	—	—	—	*	*	—	—
Betula, p. 793	—	*	*	*	*	—	—	—	—	—	—	—
Bignonia, p. 731	—	—	—	—	—	*	*	*	—	—	—	—
Bryanthus, p. 582	—	—	—	—	—	*	*	—	—	—	—	—
Buddleia, p. 649	—	—	—	—	*	*	*	*	—	—	—	—
Buxus, p. 783	—	—	—	—	*	*	—	—	—	—	—	—
Cæsalpinia, p. 353	—	—	—	*	*	—	—	—	—	—	—	—
Calycanthus, p. 172	—	—	—	—	*	*	*	*	*	*	—	—
Camellia, p. 269	—	—	—	—	*	*	*	—	—	—	—	—
Carpenteria, p. 434	—	—	—	—	—	*	*	—	—	—	—	—
Carpinus, p. 797	—	—	—	*	*	—	—	—	—	—	—	—
Carya, p. 790	—	—	—	*	*	—	—	—	—	—	—	—
Caryopteris, p. 742	—	—	—	—	—	—	—	*	*	*	—	—
Cassandra, p. 576	—	—	*	*	—	—	—	—	—	—	—	—
Cassiope, p. 576	—	—	*	*	*	*	—	—	—	—	—	—
Castanea, p. 800	—	—	—	—	—	*	*	—	—	—	—	—
Catalpa, p. 732	—	—	—	—	—	*	*	*	—	—	—	—
Ceanothus, p. 305	—	—	—	—	*	*	*	*	*	*	—	—
†Cerasus, p. 359	—	—	*	*	*	—	—	—	—	—	—	—
Cercis, p. 355	—	—	—	—	*	*	—	—	—	—	—	—
Chimonanthus, p. 172	*	*	*	—	—	—	—	—	—	—	*	*
Chionanthus, p. 642	—	—	—	—	*	*	*	—	—	—	—	—
Choisya, p. 296	—	—	—	—	—	—	*	*	—	—	—	*
Cistus, p. 223	—	—	—	—	*	*	*	*	—	—	—	—
Clematis, p. 131	*	*	*	*	*	*	*	*	*	—	—	—
Clerodendron, p. 741	—	—	—	—	—	—	—	*	*	—	—	—
Clethra, p. 598	—	—	—	—	—	—	*	*	*	*	—	—
Colutea, p. 840	—	—	—	—	—	*	*	*	—	—	—	—
Conifers, p. 972	—	—	—	—	—	—	—	—	—	—	—	—

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
†Cornus, p. 473 . . .	—	*	*	*	*	*	*	—	—	—	—	—
Coronilla, p. 344 . . .	—	—	—	*	*	*	—	—	—	—	—	—
Corylopsis, p. 444 . .	—	*	*	—	—	—	—	—	—	—	—	—
Corylus, p. 797 . . .	—	*	*	—	—	—	—	—	—	—	—	—
†Cotoneaster, p. 410 . .	—	—	—	*	*	*	—	—	—	—	—	—
†Cratægus, p. 408 . .	—	—	—	—	*	*	*	*	—	—	—	—
†Cydonia, p. 406 . . .	*	*	*	*	*	—	—	—	—	—	—	*
Cytisus, p. 380 . . .	—	—	—	*	*	*	*	*	—	—	—	—
Dabœcia, p. 582 . . .	—	—	—	—	—	*	*	*	*	—	—	—
†Daphne, p. 777 . . .	*	*	*	*	*	*	*	—	—	*	*	*
Daphniphyllum, p. 784 .	—	—	—	—	—	—	—	—	—	—	—	—
Desfontainea, p. 650 . .	*	—	—	—	—	—	—	*	*	*	*	*
Deutzia, p. 431 . . .	—	—	—	—	*	*	*	—	—	—	—	—
Diervilla, p. 485 . . .	—	—	—	—	*	*	—	—	—	—	—	—
Dimorphanthus, p. 470 .	—	—	—	—	—	—	*	*	—	—	—	—
Dirca, p. 779 . . .	—	—	*	—	—	—	—	—	—	—	—	—
Elæagnus, p. 779 . . .	—	—	—	—	—	—	*	*	*	*	*	—
Embothrium, p. 776 . .	—	—	—	—	—	*	*	—	—	—	—	—
Epigæa, p. 578 . . .	—	—	—	—	*	*	—	—	—	—	—	—
Erica, p. 580 . . .	*	*	*	*	*	*	*	*	*	*	*	*
Eriobotrya, p. 412 . .	—	—	—	—	—	—	—	*	*	—	—	—
Escallonia, p. 434 . .	—	—	—	—	—	—	*	*	*	—	—	—
Eucryphia, p. 371 . .	—	—	—	—	—	—	*	*	*	—	—	—
†Euonymus, p. 301 . .	—	—	—	*	*	*	—	—	—	—	—	—
Eurybia, p. 505 . . .	—	—	—	—	—	—	—	—	*	—	—	—
Exochorda, p. 369 . .	—	—	—	—	*	*	—	—	—	—	—	—
Fabiana, p. 695 . . .	—	—	—	—	*	*	—	—	—	—	—	—
Fagus, p. 801 . . .	—	—	—	*	*	—	—	—	—	—	—	—
Fatsia, p. 471 . . .	—	—	—	—	—	—	—	*	*	—	*	—
Forsythia, p. 637 . . .	—	—	*	*	—	—	—	—	—	—	—	—
Fraxinus, p. 640 . . .	—	—	—	—	*	*	—	—	—	—	—	—
Fremontia, p. 280 . .	—	—	—	*	*	—	—	—	—	—	—	—
Fuchsia, p. 455 . . .	—	—	—	—	—	—	*	*	*	—	—	—
Garrya, p. 476 . . .	*	*	*	*	—	—	—	—	—	—	—	—
Gaultheria, p. 575 . .	—	—	—	*	*	*	—	—	—	—	—	—
Genista, p. 328 . . .	—	—	—	—	*	*	*	*	—	—	—	—
†Gleditschia, p. 354 . .	—	—	—	—	—	*	*	—	—	—	—	—
Gordonia, p. 268 . . .	—	—	—	—	—	—	*	*	*	—	—	—
Halesia, p. 634 . . .	—	—	—	*	*	*	—	—	—	—	—	—
Halimodendron, p. 341 .	—	—	—	—	*	*	*	—	—	—	—	—
Hamamelis, p. 445 . .	*	*	—	—	—	—	—	—	—	*	*	*
†Hedera, p. 471 . . .	—	—	—	—	—	—	—	—	*	*	*	—
Helianthemum, p. 226 .	—	—	—	—	*	*	*	*	—	—	—	—
Hibiscus, p. 279 . . .	—	—	—	—	—	—	—	*	*	—	—	—
†Hippophaë, p. 781 . .	—	—	—	*	*	—	—	—	*	*	*	*
Hydrangea, p. 429 . .	—	—	—	*	*	*	*	*	*	*	—	—
†Hymenanthera, p. 234 .	—	—	*	*	—	—	—	—	—	—	—	—
†Hypericum, p. 265 . .	—	—	—	—	—	—	*	*	*	*	*	—
Idesia, p. 236 . . .	—	—	—	—	—	*	*	—	—	—	—	—
Ilex, p. 299	—	—	—	*	*	*	—	—	—	—	—	—
Indigofera, p. 336 . .	—	—	—	—	—	—	*	*	—	—	—	—
Itea, p. 435	—	—	—	—	—	*	*	*	—	—	—	—
Jamesia, p. 434 . . .	—	—	—	—	—	*	*	—	—	—	—	—
Jasminum, p. 636 . .	*	*	*	—	—	*	*	*	*	*	*	*
†Juglans, p. 791 . . .	—	—	—	*	*	—	—	—	—	—	—	—
Kalmia, p. 583 . . .	—	—	—	*	*	*	*	*	—	—	—	—
Kerria, p. 370 . . .	—	—	*	*	*	—	—	—	—	—	—	—
Kölreuteria, p. 310 . .	—	—	—	—	—	*	*	—	—	—	—	—
Laburnum, p. 327 . .	—	—	—	*	*	*	*	—	—	—	—	—
†Laurus, p. 775 . . .	—	—	*	*	*	—	—	—	—	—	—	—

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Ledum, p. 584	—	—	—	*	*	—	—	—	—	—	—	—
Lespedeza, p. 346	—	—	—	—	—	*	*	—	—	—	—	—
Leucothoë, p. 577	—	—	—	—	*	*	—	—	—	—	—	—
†Leycesteria, p. 485	—	—	—	—	—	—	*	*	*	—	—	—
Ligustrum, p. 642	—	—	—	—	—	*	*	*	—	—	—	—
Liriodendron, p. 176	—	—	—	—	*	*	—	—	—	—	—	—
Lonicera, p. 482	*	*	*	—	—	—	*	*	—	—	*	*
Loropetalum, p. 445	—	—	—	—	—	—	—	*	*	—	—	—
Lycium, p. 691	—	—	—	—	*	*	*	*	—	—	—	—
Lyonia, p. 578	—	—	—	*	*	*	—	—	—	—	—	—
Magnolia, p. 174	—	*	*	*	*	*	*	*	—	—	—	—
†Mahonia, p. 180	—	*	*	*	—	—	—	—	—	—	—	—
†Mespilus, p. 406	—	—	—	—	*	*	—	—	—	—	—	—
Myrica, p. 793	—	—	*	*	*	—	—	—	—	—	—	—
†Myrtus, p. 448	—	—	—	—	—	—	*	*	—	—	—	—
Negundo, p. 315	—	—	—	—	—	—	—	—	—	—	—	—
Neillia, p. 368	—	—	—	—	—	*	*	—	—	—	—	—
Notospartium, p. 340	—	—	—	—	—	*	*	—	—	—	—	—
Nuttallia, p. 363	—	—	*	*	—	—	—	—	—	—	—	—
Olearia, p. 504	—	—	—	—	—	—	*	*	*	*	*	*
Osmanthus, p. 641	—	—	—	—	—	*	*	*	—	—	—	—
Ostrya, p. 797	—	—	—	—	*	—	—	—	—	—	—	—
Oxydendrum, p. 577	—	—	—	—	—	*	*	—	—	—	—	—
Ozothamnus, p. 507	—	—	—	—	—	—	*	—	—	—	—	—
Pæonia (tree), p. 171	—	—	—	—	*	*	—	—	—	—	—	—
Paliurus, p. 303	—	—	—	—	—	*	*	—	—	—	—	—
Parrotia, p. 444	—	—	*	*	—	—	—	—	—	—	—	—
Paulownia, p. 712	—	—	—	—	—	*	*	—	—	—	—	—
Pavia, p. 311	—	—	—	*	*	—	—	—	—	—	—	—
†Pernettya, p. 575	—	—	—	—	*	*	—	—	—	—	—	—
Philadelphus, p. 432	—	—	—	—	*	*	*	*	—	—	—	—
†Phillyrea, p. 641	—	—	—	—	*	*	—	—	—	—	—	—
Phlomis, p. 757	—	—	—	—	—	*	*	—	—	—	—	—
Photinia, p. 411	—	—	—	*	*	*	*	—	—	—	—	—
Phyllostachys, p. 969	—	—	—	—	—	—	—	—	—	—	—	—
Pieris, p. 579	—	—	*	*	*	*	—	—	—	—	—	—
Piptanthus, p. 322	—	—	—	—	*	*	—	—	—	—	—	—
Platanus, p. 789	—	—	—	*	*	—	—	—	—	—	—	—
Populus, p. 803	—	—	*	—	—	—	—	—	—	—	—	—
†Prunus, p. 356	—	*	*	*	—	—	—	—	—	—	—	—
Ptelea, p. 297	—	—	—	—	*	*	—	—	—	—	—	—
†Pterocarya, p. 792	—	—	—	—	*	—	—	—	—	—	—	—
Pterostyrax, p. 634	—	—	—	*	*	*	—	—	—	—	—	—
†Pyrus, p. 405	—	—	—	*	*	*	*	*	*	—	—	—
†Quercus, p. 798	—	—	—	*	*	—	—	—	—	—	—	—
†Rhamnus, p. 304	—	—	—	*	*	*	*	—	—	—	—	—
Rhaphiolepis, p. 412	—	—	—	—	*	*	—	—	—	—	—	—
Rhododendron, p. 585	*	*	*	*	*	*	*	*	—	—	—	—
Rhodora, p. 591	—	—	*	—	—	—	—	—	—	—	—	—
Rhodotypos, p. 370	—	—	—	*	*	—	—	—	—	—	—	—
Rhus, p. 319	—	—	—	—	—	*	*	—	—	—	—	—
Ribes, p. 436	—	—	—	*	*	*	—	—	—	—	—	—
Robinia, p. 338	—	—	—	*	*	*	*	*	—	—	—	—
†Rosa, p. 382	—	—	—	—	—	*	*	*	*	*	*	—
†Rubus, p. 371	—	—	—	—	*	*	*	*	—	—	—	—
Salix, p. 802	—	—	—	*	*	—	—	—	—	—	—	—
†Sambucus, p. 477	—	—	—	*	*	*	*	—	—	—	—	—
†Shepherdia, p. 781	—	—	—	*	*	—	—	—	—	—	—	—
†Skimmia, p. 297	—	—	*	*	*	—	—	—	—	—	—	—
Sophora, p. 352	—	—	—	—	—	—	—	*	*	—	—	—

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Spartium, p. 330	—	—	—	—	—	*	*	*	—	—	—	—
Spiræa, p. 363	—	—	—	*	*	*	*	*	*	—	—	—
Stachyurus, p. 268	—	—	*	—	—	—	—	—	—	—	—	—
†Staphylea, p. 318	—	—	—	—	*	*	*	*	—	—	—	—
Stauntonia, p. 179	—	—	—	*	*	—	—	—	—	—	—	—
Stephanandra, p. 369	—	—	—	—	—	—	*	*	—	—	—	—
Stuartia, p. 268	—	—	—	*	*	*	*	—	—	—	—	—
†Styrax, p. 635	—	—	—	—	—	—	*	*	—	—	—	—
†Symphoricarpus, p. 481	—	—	—	—	—	—	*	*	*	—	—	—
Syringa, p. 638	—	—	—	*	*	*	—	—	—	—	—	—
Tamarix, p. 264	—	—	—	—	—	—	*	*	*	—	—	—
Tecoma, p. 732	—	—	—	—	—	*	*	*	—	—	—	—
Tilia, p. 281	—	—	—	—	—	*	*	*	—	—	—	—
Trachycarpus, p. 956	—	—	—	—	—	—	—	—	—	—	—	—
Ulex, p. 330	—	—	*	*	*	—	*	*	*	*	*	—
Ulmus, p. 785	—	—	*	*	*	—	—	—	—	—	—	—
†Vaccinium, p. 572	—	—	—	—	*	*	*	*	*	*	—	—
Veronica, p. 724	—	—	—	—	*	*	*	*	*	—	—	—
†Viburnum, p. 478	*	*	*	*	*	*	*	—	—	—	—	*
Vinca, p. 645	—	—	—	*	*	*	*	—	—	—	—	—
Virgilia, p. 352	—	—	—	—	*	*	*	*	—	—	—	—
Weigela, p. 485	—	—	—	—	*	*	—	—	—	—	—	—
Wistaria, p. 337	—	—	—	*	*	*	*	*	—	—	—	—
†Xanthoceras, p. 312	—	—	—	—	*	*	—	—	—	—	—	—
Xanthorhiza, p. 164	—	—	*	*	—	—	—	—	—	—	—	—
Yucca, p. 820	—	—	—	—	—	—	*	*	*	—	—	—
Zenobia, p. 578	—	—	—	—	—	—	*	*	—	—	—	—

AUTUMN TINTS

While the spring-time is remarkable for the beautiful and brilliant greens of the foliage of the numerous trees and shrubs which have awakened from their winter sleep, the autumn is no less remarkable for the great change of colouring that has come over this same foliage. In a few short months from May to October, the leaves have been hard at work assimilating food and building up the tissues of the plants. When they burst from their protecting winter buds, either from the branches or the seeds, they proceed to perform their natural functions with the greatest energy. But as the hot summer approaches, and then the autumn with its shorter days, the energy of the protoplasm (see p. 22) within the cells gradually subsides and ultimately ceases altogether in the case of those leaves which are termed 'deciduous,' or that remain on the branches but one season.

It is unnecessary to dilate here upon the scientific reasons as to the falling of the leaves in autumn; but it may be remarked that all the food manufactured for the plants is not wasted by the dropping of the foliage. Before this it has been drafted down the stems and to the roots in the case of perennials and root crops by means of the fibre bundles referred to at p. 30 as composing the main nerves and veins of the leaves. During the process of withdrawal a change in colour comes over the foliage. The more or less brilliant greens are gradually replaced by yellow, orange, red, purple, and a variety of intermediate shades until most beautiful pictures are produced upon the landscape by this autumnal colouring. The masses of gold presented by the stately Elms, the deeper amber yellow of the Horse Chestnuts, the beautiful russety-brown of the Beech and Oaks, the purple-red of the Virginia Creeper, and the tints of all our native trees and shrubs are sufficiently well known and never fail to call forth our admiration during the autumn. But there are many other trees and shrubs natives of other climes quite as remarkable for their vivid colouring at this period, and they are well worthy of a place in gardens where they can be grown to produce an effect in conjunction with the various hues of the numerous evergreens of the Conifer Family, the Common Holly &c. It has been noticed in connection with autumn colouring that leaves covered with hair or down undergo but very little change in colour, and it therefore looks as if the change in the cells was due to the light. While all deciduous trees and shrubs are more or less beautiful in the colouring of their foliage in autumn, some are particularly fine and deserve especial mention in the following list. The name of the genus only is mentioned, as the species can easily be found at the page referred to after the name.

LIST XIII

Trees, Shrubs, and Climbers remarkable for the Autumnal Colouring of their Foliage

Acer, p. 313.
Actinidia, p. 267.
Æsculus, p. 311.
Akebia, p. 179.
Amelanchier, p. 413.
Aralia, p. 469.
Azalea, p. 574.
Berberis, p. 180.
Betula, p. 793.
Carya, p. 790.
Castanea, p. 800.
Cercis, p. 355
Clerodendron, p. 741.
Cornus, p. 473.
Corylus, p. 797.
Cratægus, p. 408.
Enkianthus, p. 579.
Eucryphia, p. 371.
Euonymus, p. 301.
Fagus, p. 801.
Hamamelis, p. 445.
Kölreuteria, p. 310.
Leucothoë, p. 577.
Liquidambar, p. 445.
Nyssa, p. 476.
Oxydendrum, p. 577.
Parrotia, p. 444.
Pavia, p. 311.
Prunus, p. 356.
Pterocarya, p. 792.
Quercus, p. 998.
Rhexia, p. 449.
Rhus, p. 319.
Ribes, p. 436.
Salix, p. 802.
Sambucus, p. 477.
Spiræa, p. 363.
Stephanandra, p. 369.
Stuartia, p. 268.
Styrax, p. 635.
Ulmus, p. 785.
Viburnum, p. 478.

LIST XIV

Evergreen Trees and Shrubs

Arbutus Unedo, p. 574.
Arundinaria, vars., p. 965.
Aucuba japonica, p. 475.
Azara microphylla, p. 235.
Bambusa, vars., p. 968.
Berberis Aquifolium, p. 180.
  Darwini, p. 181.
  nepalensis, p. 181.
Berberis stenophylla, p. 182.
  wallichiana, p. 182.
Buxus sempervirens, p. 783.
Ceanothus, vars., p. 305.

- **Conifers, p. 972.**
- **Cotoneaster, vars., p. 410.**
- **Cratægus Pyracantha, p. 409.**
- **Daphne pontica, p. 779.**
- **Daphniphyllum glaucescens, p. 784.**
- **Elæagnus, vars., p. 779.**
- **Empetrum nigrum, p. 805.**
- **Escallonia illinita, p. 434.**
  - **punctata, p. 435.**
- **Garrya elliptica, p. 476.**
- **Gaultheria, vars., p. 576.**
- **Hedera, vars., p. 471.**
- **Ilex, vars., p. 299.**
- **Kalmia, vars., p. 583.**
- **Ledum latifolium, p. 584.**
- **Leucothoë axillaris, p. 577.**
- **Ligustrum, vars., p. 642.**
- **Loiseleuria procumbens, p. 582.**
- **Lonicera aureo-reticulata, p. 484.**
  - **fragrantissima, p. 483.**
- **Lyonia paniculata, p. 578.**
- **Magnolia grandiflora, p. 175.**
- **Myrtus communis, p. 448.**
- **Olearia Haasti, p. 504.**
- **Osmanthus, vars., p. 641.**
- **Pernettya, vars., p. 875.**
- **Phillyrea, vars., p. 641.**
- **Phyllostachys, vars., p. 969.**
- **Pieris, vars., p. 579.**
- **Pittosporum crassifolium, p. 236.**
- **Prunus Lauro-cerasus, p. 360.**
- **Quercus Ilex, etc., p. 800.**
- **Rhododendron, vars., p. 585.**
- **Rhodotypos kerrioides, p. 370.**
- **Skimmia, vars., p. 297.**
- **Smilax, p. 808.**
- **Umbellularia californica, p. 775.**
- **Veronica, vars., p. 724.**
- **Viburnum, vars., p. 478.**

HARDY WATER AND BOG PLANTS

It is only of late years that any particular attention has been given to seriously utilising pieces of water in gardens. The common white Water Lily (p. 186) and the yellow Brandy Bottle (p. 185) were looked upon more or less as beautiful aquatic weeds. But the numerous hardy and brilliantly coloured hybrids that are now in cultivation (see p. 187) have revolutionised former ideas in regard to the use of water in the garden, and have served to call attention not only to Water-Lilies but to many other ornamental plants which may be grown with advantage either in water or on its banks.

The following is a list of the best water and bog plants. The descriptions, cultural information &c. will be found at the pages given after each name.

LIST XV

A Selection of Ornamental Water and Bog Plants

- **Acorus Calamus, p. 954.**
  - **gramineus, p. 954.**
- **Alisma, vars., p. 805.**
- **Aponogeton distachyon, p. 805.**
- **Butomus umbellatus, p. 806.**
- **Caladium virginicum, p. 954.**
- **Calla palustris, p. 955.**
- **Caltha palustris, p. 150.**
- **Carex paniculata, p. 971.**
  - **pendula, p. 971.**
- **Cyperus longus, p. 971.**
- **Glyceria aquatica, p. 963.**
- **Hottonia palustris, p. 604.**
- **Hydrocharis Morsus-ranæ, p. 883.**
- **Limnanthes Douglasi, p. 292.**
- **Limnanthemum nymphæoides, p. 658.**
- **Limnocharis Humboldti, p. 806.**
- **Lobelia cardinalis, p. 556.**
- **Menyanthes trifoliata, p. 657.**
- **Myosotis palustris, p. 677.**
- **Nuphar, vars., p. 185.**
- **Nymphæa, vars., p. 186.**
- **Orontium aquaticum, p. 955.**

- Parnassia, vars., p. 428.
- Peltandra virginica, p. 954.
- Polygonum affine, p. 768.
  - Bistorta, p. 768.
- Pontederia cordata, p. 882.
- Ranunculus aquatilis, p. 147.
- Ranunculus Lingua, p. 149.
- Richardia africana, p. 955.
- Rumex Hydrolapathum, p. 768.
- Sagittaria sagittifolia fl. pl., p. 806.
- Scirpus lacustris, p. 972.
- Sparganium, vars., p. 953.
- Stratiotes aloides, p. 883.
- Thalia dealbata, p. 884.
- Typha in var., p. 953.
- Water Lilies, p. 186.

A Selection of Plants thriving in Marshy or Boggy Ground

- Arundo Donax, p. 958.
- Bamboos, Hardy, p. 964.
- Butomus umbellatus, p. 806.
- Calla palustris, p. 955.
- Caltha, vars., p. 150.
- Carex pendula, p. 971.
- Chrysobactron Hookeri, p. 826.
- Coptis trifolia, p. 154.
- Cornus canadensis, p. 474.
- Crinum capense, p. 911.
- Cypripedium spectabile, p. 893.
- Dodecatheon Jeffreyanum, p. 626.
  - Meadia and var. alba, p. 626.
- Drosera, vars., p. 444.
- Eomecon chionantha, p. 195.
- Epilobium album, hirsutum, &c. p. 451.
- Eupatorium, vars., p. 494.
- Galax aphylla, p. 600.
- Gentiana Pneumonanthe, p. 655.
- Gunnera scabra, p. 446.
- Helonias bullata, p. 878.
- Houttuynia californica, p. 774.
  - cordata, p. 774.
- Iris fœtidissma, p. 922.
  - fulva, p. 923.
  - graminea, p. 923.
  - Kæmpferi, p. 925.
  - Monnieri, p. 927.
  - ochroleuca, p. 927.
  - Pseudacorus, p. 929.
- Iris sibirica, p. 931.
- Juncus spiralis, p. 882.
- Leucanthemum lacustre, p. 584.
- Leucojum æstivum, p. 908.
  - Hernandezii, p. 908.
- Liatris pycnostachya, p. 495.
  - spicata, p. 495.
- Lilium canadense, p. 845.
  - carolinianum, p. 856.
  - pardalinum, p. 853.
  - superbum, p. 856.
- Linnæa borealis, p. 482.
- Lobelia cardinalis, p. 556.
- Lychnis Flos-Cuculi fl. pl., p. 256.
- Lysimachia clethroides, p. 629.
  - Nummularia, p. 629.
  - thyrsiflora, p. 630.
  - vulgaris, p. 630.
- Lythrum, vars., p. 450.
- Monarda didyma, p. 750.
- Myosotis palustris, p. 678.
- Nierembergia rivularis, p.6
- Nyssa aquatica, p. 476.
- Orchis, vars., p. 891.
- Osmunda palustris, p. 1022.
  - regalis, p. 1022.
- Oxycoccus, vars., p. 573.
- Parnassia, vars., p. 428.
- Phormium tenax, p. 816.
- Pinguicula, vars., p. 728.
- Polygonum compactum, p. 769.
  - Sieboldi, p. 769.
- Primula denticulata, p. 607.
  - farinosa, p. 608.
  - involucrata, p. 610.
  - japonica, p. 610.
  - Munroi, p. 610.
  - Parryi, p. 613.
  - Reidi, p. 614.
  - rosea, p. 615.
  - sikkimensis, p. 616.
- Pyrethrum uliginosum, p. 535.
- Rhexia virginica, p. 449.
- Rodgersia podophylla, p. 415.
- Sagittaria, vars., p. 806.
- Samolus littoralis, p. 632.
- Sarracenia purpurea, p. 189.
- Saxifraga Hirculus, p. 421.
  - peltata, p. 424.
- Scirpus zebrina, p. 972.
- Senecio pulcher, p. 542.
  - speciosus, p. 543.
- Spigelia marilandica, p. 649.
- Spiræa Aruncus, p. 364.
  - astilboides, p. 364.
  - kamtschatica, p. 364.
  - palmata, p. 365.
  - Ulmaria, p. 365.
- Swertia perennis, p. 657.
- Symplocarpus fœtidus, p. 955.
- Thalictrum anemonoides, p. 138.
  - flavum, p. 138.
- Tradescantia virginica, p. 807.

LAWNS

All other things being equal, there is nothing that lends a greater charm and repose to a garden than a well-kept lawn. Where such exists it should always be carefully attended to, as once a lawn is allowed to become wild, it takes a long time to bring it back to a really good condition.

In the pages of this work many plants are mentioned as being suitable for lawn decoration. It must not, however, be taken for granted that each and every plant thus mentioned is to be grown on the lawn. It would be far better to leave the lawn quite free from all except its natural vegetation than to spoil it by dotting groups of plants, or solitary specimens, all over it in a meaningless kind of way. The lawn should not be treated as if it were an orchard or a shrubbery, and anything that tends to interfere with its repose, or jars upon the taste, is to be avoided.

Making a Lawn.—Lawns are made in two ways—either by sowing seed or laying turf. Both ways are good, but some have a preference for one rather than the other. When a lawn has been made by sowing grass it takes about three years before a really good foundation has been made, and during that period numerous rollings, cuttings, and waterings must have been given. The advantage of making a lawn with turf is that a good one can be obtained practically in one season—with the aid of frequent cuttings, rollings, and waterings. If the turf is good and free from weeds it is on the whole a better and quicker method of producing a lawn.

Whether seeds or turf are used, the first and all-important point is to have good soil with a surface properly levelled and quite free from hillocks and hollows, however slight. The soil should be well dug and manured and afterwards trodden down with the feet, or rolled; but the roller should not be too heavy—one weighing about one cwt. will be sufficient, or the ground will be pressed into a caked condition, more or less impervious to the passage of water.

Levelling.—This is readily accomplished by means of a spirit level attached to the edge of a level board. Special implements are used for the purpose, but a stout quadrangular pole, about 8 ft. (or half a rod) long will do equally well, provided its edges are perfectly level.

Where the lawn is to be of some size, wooden pegs must be driven into the soil at such intervals that the levelling rod can reach from one to the other. Having fixed one peg at what is to be the ultimate height and level of the lawn, all other pegs must be fixed or driven into the soil until the top of each peg is on a level with that of the next. This can be easily ascertained by means of the spirit level.

The ground itself should also be carefully gone over with the level, resting the rod in all directions with a view to finding any risings or depressions. Where such occur they must be reduced or filled up by means of the rake until the entire surface is as flat and as level, but not necessarily as smooth, as a billiard table.

This point having been reached, and the soil having settled down properly, seeds of the best lawn grass may be sown during mild showery weather in March or April, as it then germinates in a very short time. Seeds may also be sown under similar circumstances in September, so that the seed shall germinate and the young grass become established before the setting in of winter.

To ensure a thick and even sward, from 60 to 80 lbs. (or 3–4 bushels) of grass seed will be required to sow an acre of ground. The seed should be sown broadcast and as evenly as possible. The soil is afterwards raked over lightly and a light roller may also be used to bring the seeds and soil in closer contact, and give a finish to the work. If the weather is not showery, a good watering is also necessary and may be repeated from time to time if necessary.

When the grass has grown sufficiently long, it should be cut with a scythe—*not* with a mowing machine, as the latter is apt to tear roots and all up at first. It is as a rule safer to have the first few cuttings done with a scythe, so that the grass may become strong and tufted, and thus better able to stand the mowing machine afterwards.

When turf is used, the chief point to remember is: keep the surface level. Each turf is about 3 ft. long, 1 ft. wide, and an inch or so thick. The thickness, however, varies a good deal, and where thin turves are used a little fine soil should be placed beneath to bring them to the proper level. As three turves go to a square yard it is easy to estimate the number required for any particular piece of ground. The turf cutters, however, generally cut a shade under rather than over the dimensions, and it is therefore always safer to have a few extra ones in case of necessity.

When the turves have all been laid down neatly edge to edge, a little fine soil is sprinkled over the surface, and brushed into the crevices. The whole surface may then be thoroughly beaten with a turf beater (a thick flat-faced piece of wood, with a long handle let in obliquely in the centre at the back) so as to reduce any slight inequalities. Failing this, beating the turf with the back of a strong spade will be almost equally efficacious. The first cuttings should be done with a scythe, and frequent rollings and waterings will soon make a fine greensward.

General Treatment.—Once well established, a lawn should never be neglected. If looked after regularly, it will last in good condition for years, but if not, it will in the course of a few years show signs of wearing out.

Weeding.—This should be done regularly in spring and autumn so as to keep such plant pests as Plaintain, Daisies, Dandelions, and other weeds down. Frequent cutting with the machine will prevent them flowering and ripening seed. Where, however, they take a strong hold they may be eradicated by dropping a little vitriol (sulphuric acid) or arsenic down the centre of each with a pointed skewer. The latter should be pushed down into the weeds, as some of them have tap-roots which, unless killed, will throw forth other shoots after the first ones have been destroyed. An intelligent lad can do this work easily, but great care must be taken in using the poison.

Where the use of poison is feared or disliked, the only safe way to destroy weeds on lawns is to grub them up with an old knife or 'daisy-grubber.' It takes a long time, but if done systematically is very effective. An excellent plan is to strain two white lines about 2 feet apart on the grass and proceed to root up all the weeds between them. In this way the work is done systematically and in such a narrow space there is little chance of overlooking the weeds. When one portion has been cleaned, one line may be taken up and stretched 2 feet from the other on the opposite side, proceeding with the work in the same way.

Manuring Lawns.—In the course of time the grass will begin to look poor, and lack vigour and freshness in growth, unless it has some plant food put into the soil in some way. Covering the lawn with short well-rotted manure is practically out of the question in most cases, owing to its unsightliness. Liquid manures of cow-dung, guano, sulphate of ammonia &c. may, however, be given at frequent intervals, care being taken that they are not too strong, otherwise the grass may be 'burnt' and present a brownish appearance. About 6–8 lbs. of basic slag and 3–4 lbs. of kainit, mixed together, may be used in the autumn or winter months, and will sprinkle over about 40 square yards. About 3 or 4 lbs. of superphosphate of lime will also cover the same area and may be applied, not with the basic slag and kainit, but the following spring. Rape-dust or fine bone-meal at the rate of about 4 lbs. to about 40 sq. yds. may also be used.

Mossy Lawns.—Moss-covered lawns are very unsightly, and sometimes very difficult to clean. The moss should be well raked out with a good rake in moist weather during the autumn. The lawn should be gone over in two or three different directions, and although the grass will have the appearance of being torn up by the roots, it will in reality be injured very little. After being well cleared of moss, some fine rich soil and wood ashes may be strewn over the surface, and a little basic slag and kainit, as recommended above, may also be added. The surface is then levelled and lightly rolled. In spring any vacant spot should be sown with grass seed, so as to bring the whole surface into a green state.

Renovating old Lawns.—Where lawns, notwithstanding every care, show unmistakable signs of decay, there is only one thing left to be done. That is to lift the turf in autumn, and give the soil beneath a thorough digging and manuring as if about to lay turves in the first place. After the preparation and levelling of the soil in the way indicated above, the turves may be replaced, beaten down and rolled, and receive the same treatment generally as a newly made lawn.

LIST XVI

Ornamental Plants suitable for large Lawns, Parks &c., and for Subtropical Gardening

Abutilon, p. 278.
Acanthus, p. 736.
Agave, p. 916.
Aralia, p. 469.
Arundinaria, p. 965.
Arundo, p. 958.
Bambusa, p. 968.
Bocconia, p. 195.
Canna, p. 885.
Catalpa, p. 732.
Chamærops excelsa, p. 956.
Cineraria maritima, p. 541.
Cordyline australis, p. 822.
Cortaderia, p. 960.
Eucalyptus globulus, p. 447.
Ferula, p. 468.
Funkia, p. 816.
Grevillea robusta, p. 776.
Gunnera, p. 446.
Gynerium, p. 960.
Melianthus, p. 317.
Molopospermum, p. 467.
Montanoa, p. 513.
Musa Ensete, p. 888.
Paulownia, p. 712.
Phormium tenax, p. 816.
Phyllostachys, p. 969.
Polygonum, p. 768.
Rhus, p. 819.
Ricinus, p. 784.
Sambucus aurea, p. 478.
Solanum, p. 687.
Trachycarpus, p. 956.
Wigandia, p. 669.
Yucca, p. 820.
Zea Mays, p. 964.

GARDEN WALKS AND PATHWAYS

WHILE it is an excellent thing to have beautiful Lawns, Flower Borders, Rock Gardens, and patches of Fruits and Vegetables in a garden, it is no less excellent to be able to reach any or all of these particular spots by means of pleasant walks, paths, or roadways. In designing any garden, therefore, it is a matter of the greatest importance to allow a proper amount of space for walks and pathways. Whether these are perfectly straight or more or less curved, wide or narrow, will depend a good deal upon individual taste and the size of the garden. Some people seem to have a mania for making walks in every possible place, and this results in cutting the surface of the garden up into a kind of patchwork, with little triangles here, circles there, horse-shoes, rectangles, and many other fantastic and useless shapes for flower beds &c. dotted about here and there. As few footpaths as possible should be in the garden, and space given only to those absolutely necessary. This will not only allow of more space for flowers, fruit, or vegetables, but will not necessitate so much labour in the up-keep of the pathways.

Gravel Paths.—As these are undoubtedly the most important, it is necessary that they should be well made at first, as nothing will give so much trouble and inconvenience afterwards as badly constructed gravel paths. The main object in making a good pathway is to secure a firm and pleasant surface for walking upon in all weathers and seasons. The surface should be such that it will not work up into large pebbles in summer or sticky mud in winter. Pathways should always have a gentle slope away from dwellings or other buildings, and the highest point should be a few inches at least below what builders call the 'damp course' in houses.

Drainage.—To secure a good pathway it is first of all necessary to consider the question of drainage, and also the nature of the soil beneath the surface. In wet heavy soils the drainage requires to be in a more perfect condition than when walks are constructed on a gravelly bottom. At p. 44 the drainage of flower-pots &c. for sowing seeds has been mentioned. Almost precisely the same principle must be carried out with pathways. In heavy soils there should be 1-2 ft. of old brickbats, rubble, clinkers &c. well rammed down and made perfectly hard without being mixed with any finer materials. Above this layer some finer rubble, stones, clinkers &c. may be placed and also rammed down firmly and evenly. This will give a perfectly porous layer between the surface and the soil beneath, and if the drainage is to be made still more perfect, as is often necessary with important walks and drives in public gardens, provision must be made at first to have drain pipes laid at the sides to receive the surface water in times of heavy rain or sudden downpours. The drainage having been made perfect, the surface may then be covered 2–4 in. deep—more or less—with the best yellow gravel. Care must be exercised in selecting this, as some kinds have far too much clayey matter, and others too much sand and grit, to bind properly when rolled. What is technically known as 'hoggin' in the London neighbourhood is an excellent gravel for pathways. It binds well, has a good colour, and when properly rolled down and watered gives a neat and finished appearance to the garden. In some large parks and gardens the gravel walks are covered with ground shells. These make a good surface for walking on in dry weather, although at first the colour is somewhat trying to the eyes, and in wet weather they are not an improvement on good gravel. Pathways made of gravel should have a slightly convex top, so that the sides slope gently away from the centre. This will throw the rain off towards the sides, and give a good foothold in the centre, even in very wet weather, on well-constructed pathways.

Weeding &c.—Pathways, like lawns, require constant attention to keep them free from weeds and neat in appearance. It becomes necessary occasionally to have the surface pricked up all over, and raked into proper positions so as to get rid of any hollows caused by wear and tear. Frequent rolling is also necessary to keep a good surface. Weeds if not eradicated by the hoe or hand may be destroyed by one of the many weed killers now on the market. Great care should be exercised in using these, and the instructions given by sellers may be followed out to avoid accidents to other vegetation and animals.

Asphalt Paths.—Of late years Asphalt as used for making pavements has been used a good deal for garden paths, and when well made they seem to be very satisfactory, especially between tiled edgings. They have a smooth and agreeable walking surface in all weathers, and when constructed with a slightly convex surface—arching from the centre to the sides—the rain is readily drained away. They have another advantage in being nearly always quite free from weeds. This is a double-barrelled boon—it saves labour and the cost of weed-killers. Notwithstanding these advantages, however, the gravel pathway still holds its own in most gardens, chiefly perhaps on account of its colour, and because when the grass edgings adjoining asphalt paths are cut they leave a conspicuous narrow border of soil between the asphalt and the turf; and asphalt cannot be so readily laid as gravel to cover unsightly spaces.

Grass Walks.—There is nothing to equal the pleasure derived from walking on a beautiful greensward, whether it be a well-kept lawn or an alley between the flower borders. In small gardens it may be, and of course is in many cases, impossible to have grassy walks; but in large parks and gardens many parts now covered with gravel might be more appropriately covered with grass.

A visit to the Royal Gardens, Kew, will give one a good idea of how well grassy avenues, vistas, and pathways may be made, and how beautiful they look between the trees, shrubs, and flower beds. Years ago a long vista from the Palm House to the banks of the Thames facing Syon House was an ugly and very pebbly broad walk which no one ever walked upon unless obliged to by wet weather. The gravel, however, has vanished, and the greensward has taken its place, much to the advantage of the gardens and the comfort of visitors. This might be imitated with advantage in other gardens. The only disadvantage a grass walk can have is in wet weather, but at such a time there is but little inducement to use pathways at all—whether gravel or grass—only in the case of necessity. The short time during the year that grass may be unfit to walk upon should not, however, prevent its being used when possible for walks during the greater portion of the year.

CLASSIFICATION OF PLANTS

It is a natural and almost unconscious process to place any two or more plants similar in appearance and character into the same group and say that they are more or less closely related, although they differ from each other in minor details. This is practically classifying plants according to their relationship to each other into natural groups, and by such a process the gardener is enabled to deduce many points that may be of importance to him in the actual work of cultivation.

It would, for instance, be a very poor observer indeed who could not *see* the difference between, say, a Buttercup and a Lily, but it might be somewhat difficult for him to explain in words exactly the points wherein they differ. Just imagine for a moment a person who had never seen a Buttercup or a Lily asking what they were and how he was to distinguish one from the other, and some idea will be gained as to the difficulty in giving the information in such a way that the Buttercup or Lily will not be mixed up with an Orchid, or a Rose, or a Tulip, or any other plant.

When plants are so common that they are grown by almost everybody, their general features or characteristics become impressed on the mind, and the names which botanists have given them usually come tripping off the tongue with ease. But when a strange plant appears without a name, an effort is at once made, almost unconsciously, to place it near some plant already known. The roots, stems, leaves, flowers fruits &c. are carefully and critically examined and compared one by one, and the plant is said to come near such and such a species but differs from it in many respects.

If the cultivator of such a plant has even only a slight knowledge of the way in which plants have been grouped more or less naturally by botanists, he may, by the aid of his books, run the unknown plant very close, if not quite, to its own group, from the characters he sees. But if his books have the plants arranged simply in alphabetical order according to their names and not according to their relationship, he may as well give up his search at once, unless he has the time and inclination to wade through every name from A to Z. Indeed, descriptive plant-books arranged in purely alphabetical order are only of value when the *proper name* of the plant about which information is required is already known. This is a *sine qua non* to the use of such books. 'To call a Rose by any other name' would in such cases probably lead to unlooked-for and perhaps not altogether satisfactory results when the cultural details came to be applied.

For these reasons chiefly, and also because the majority of amateurs often find a difficulty in remembering the botanical names of plants, it has been considered best to have the plants described in this work arranged in their natural groups or Orders, so that in the event of a cultivated plant being nameless, it may with very little trouble soon be found by means of the 'Key' given below. Where the name of a plant is already known, a reference to the Index at the end of the work will at once give the page at which description, culture, propagation and other information may be found concerning it. The amateur and the professional gardener will both find it an excellent and interesting proceeding, however, to try to place or determine any particular plant into its proper group by means of examining the characters of the flowers, leaves, stems, roots &c.

The 'Key' to the natural Orders of Plants described in this work will be found useful in trying to place a plant whose name is unknown in its proper group, and, it is hoped, will ultimately lead to its identification. Although an attempt has been made to dispense as far as possible with botanical or technical terms, the use of some was unavoidable. Such terms will be found explained in the Illustrated Glossary at p. 1.

KEY to the NATURAL ORDERS of PLANTS described in this work

The Vegetable Kingdom may be divided into two Great Groups or *Sub-Kingdoms*, namely:—

I. FLOWERING PLANTS, or PHANEROGAMS.

These are trees, shrubs or herbs with more or less conspicuous flowers provided with stamens and pistils in the same or separate flowers, and seeds containing a distinct embryo, as in annuals and biennials, herbaceous plants, trees, shrubs &c.

II. NON-FLOWERING PLANTS, or CRYPTOGAMS.

These include the Ferns (Filices), Horsetails (Equisetum), Clubmosses (Lycopodium), Mushrooms (Agaricus), and all the lower vegetable organisms.

Flowering Plants (or Phanerogams) are divided into Two *Classes*:—

(i.) **ANGIOSPERMS.**—This group includes all the flowering plants popularly known as annuals, biennials, herbaceous perennials and trees and shrubs, described in this work from p. 131 to p. 972. They are characterised by having roots, stems, leaves, and flowers, and have their seeds enclosed or hidden in an ovary, seed vessel, or fruit. It is this latter characteristic that gives the name to the group, the word 'angiosperm' being derived from '*angios*,' hidden, and '*sperma*,' a seed.

(ii.) **GYMNOSPERMS.**—In these plants the flowers are strictly unisexual, that is either all female or all male, and the perianth, ovary, and styles are absent. The ovules are naked (not enclosed in carpels), and are fertilised by direct contact with the pollen, and not by means of a pollen tube (see p. 24). Cotyledons (seed-leaves) 2, or sometimes in whorls of 3 or more.

Natural Orders with these Characters.—GNETACEÆ, p. 972, CONIFERÆ, p. 972.

The Angiosperms (or plants having their seeds enclosed in an ovary) are also divided into two main groups or *sub-classes*, viz. :—

1. DICOTYLEDONS (p. 131) and 2. MONOCOTYLEDONS (p. 805), the characters of which are given below with the various groups belonging to them.

Sub-Class I. DICOTYLEDONS (p. 131 to p. 805).

The plants belonging to this group are described in this work from p. 131 to p. 805, and are characterised by having stems with bark, pith, and wood, and when perennial, increasing in diameter by an annual layer of wood added to the outside of the old wood, and another of bark to the inside of the old bark. Leaves usually with netted veins. Flowers with the parts usually in fours or fives, and usually with a distinct perianth. Ovules in closed carpels, through the tissues of which the pollen tube passes to effect fertilisation as described at p. 24. Embryo with 2 cotyledons or seed leaves.

Dicotyledons are subdivided into 3 main divisions, viz. :—1. *Polypetalæ*; 2. *Disciforæ*; and 3. *Calycifloræ*, each of which is again subdivided into series, cohorts, and natural orders as below.

Division I. *POLYPETALÆ* (p. 131 to p. 477).

Flowers with both calyx (sepals) and corolla (petals). Petals free or distinct from each other.

Series I. THALAMIFLORÆ (p. 131 to p. 284).

Sepals usually free. Petals definite, often numerous. Stamens inserted on a torus or receptacle, hypogynous, numerous or definite. Carpels free (apocarpous) or united (syncarpous).

Cohort 1. RANALES (carpels usually free).—Stamens numerous. Perianth consisting of calyx only, or of calyx and corolla.

Natural Orders with these Characters.—RANUNCULACEÆ (p. 131), CALYCANTHACEÆ (p. 172), MAGNOLIACEÆ (p. 173), ANO-

NACEÆ (p. 177), MENISPERMACEÆ (p. 178), BERBERIDEÆ (p. 178), NYMPHÆACEÆ (p. 185).

Cohort 2. PARIETALES (placentas parietal).—Stamens numerous or definite in number. Ovary 1-celled or with spurious dissepiments. Ovules usually many.

Natural Orders with these Characters.—SARRACENIACEÆ (p. 188), PAPAVERACEÆ (p. 189), FUMARIACEÆ (p. 198), CRUCIFERÆ (p. 201), RESEDACEÆ (p. 222), CISTINEÆ (p. 223), VIOLARIEÆ (p. 227), BIXINEÆ (p. 235).

Cohort 3. POLYGALINEÆ.—Sepals and petals 5, rarely 4 or 3. Stamens equal to or twice as many as the petals or sepals. Carpels usually 2, cohering in a more or less perfectly 2-celled ovary. Flowers regular or irregular.

Natural Orders with these Characters.—PITTOSPOREÆ (p. 236), POLYGALEÆ (p. 237).

Cohort 4. CARYOPHYLLINEÆ (placentas free central).—Sepals 2–5, rarely 6, free or united. Petals equal in number, or more, or fewer by abortion. Stamens as many as petals, or twice as many, rarely more or fewer. Ovary usually 1-celled.

Natural Orders with these Characters.—FRANKENIACEÆ (p. 238), CARYOPHYLLEÆ (p. 238), PORTULACEÆ (p. 261), TAMARISCINEÆ (p. 264).

Cohort 5. GUTTIFERALES (stamens numerous, calyx imbricate).—Sepals 2–5, often 4 or 5, rarely numerous. Petals as many as sepals, rarely more. Ovary usually 3- or more celled. Flowers regular.

.*Natural Orders with these Characters.*—HYPERICINEÆ (p. 265), TERNSTRŒMIACEÆ (p. 267).

Cohort 6. MALVALES (stamens numerous, calyx valvate).—Calyx lobes or sepals 5, rarely 2–4. Petals usually 5, rarely none. Stamens free or united in one bundle. Ovary usually 3- or more celled.

Natural Orders with these Characters.—MALVACEÆ (p. 270), STERCULIACEÆ (p. 280), TILIACEÆ (p. 280).

Series II. DISCIFLORÆ (p. 284 to p. 322).

Flowers regular with parts usually in fives. Calyx usually free from the ovary. Stamens often definite inserted below or above or around a disc. Ovary usually superior or immersed in the disc. Carpels usually united.

Cohort 1. GERANIALES.—Disc often beneath the stems or adnate to the staminal column, or reduced to glands alternating with the petals. Ovary entire or often lobed, or with almost free carpels.

Natural Orders with these Characters.—LINEÆ (p. 282), GERANIACEÆ (p. 284), RUTACEÆ (p. 295), SIMARUBEÆ (p. 298).

Cohort 2. OLACALES.—Disc cup-shaped or ringed, free, or bearing the stamens and petals, or divided into glands. Ovary entire. Leaves simple.

Natural Order with these Characters.—ILICINEÆ (p. 299).

Cohort 3. CELASTRALES.—Disc cushion-like or adnate to the calyx. Stamens inserted around or on the margins of the disc. Ovary usually entire. Leaves simple or rarely compound.

Natural Orders with these Characters.—CELASTRINEÆ (p. 301), RHAMNEÆ (p. 303), AMPELIDEÆ (p. 307).

Cohort 4. SAPINDALES.—Disc various. Stamens inserted beneath, above or around it. Ovary entire or often lobed. Leaves pinnate, or rarely simple or digitate. Flowers often polygamous diœcious.

Natural Orders with these Characters.—SAPINDACEÆ (ACERINEÆ) (p. 310), ANACARDIACEÆ (p. 319), CORIARIEÆ (p. 321).

Series III. CALYCIFLORÆ (p. 322 to p. 477).

Calyx tube enclosing the ovary or adnate to it. Petals in one series enclosed by the calyx tube. Stamens many or definite, inserted on the calyx tube. Ovary inclosed by calyx tube or inferior.

Cohort 1. ROSALES.—Flowers regular or irregular, often hermaphrodite. Carpels solitary or numerous, free or united at the base. Styles usually distinct. Leaves variously compound, or simple.

Natural Orders with these Characters.—LEGUMINOSÆ (p. 322), ROSACEÆ (p. 355), SAXIFRAGEÆ (p. 414), CRASSULACEÆ (p. 437), DROSERACEÆ (p. 443), HAMAMELIDEÆ (p. 444), HALORAGEÆ (p. 446).

Cohort 2. MYRTALES.—Flowers regular or nearly so, usually hermaphrodite. Ovary syncarpous, inferior or enclosed by calyx tube. Style undivided. Leaves simple, entire, rarely toothed.

Natural Orders with these Characters.—MYRTACEÆ (p. 447), MELASTOMACEÆ (p. 449), LYTHRARIEÆ (p. 449), ONAGRARIEÆ (p. 451).

Cohort 3. PASSIFLORALES.—Flowers regular or nearly so, rarely irregular. Ovary syncarpous, inferior or superior, usually enclosed by the calyx tube, 1-celled. Styles more or less divided or entire, or distinct from the base. Leaves entire, lobed, or dissected.

Natural Orders with these Characters.—LOASEÆ (p. 457), PASSIFLOREÆ (p. 459), CUCURBITACEÆ (p. 460), BEGONIACEÆ (p. 462).

Cohort 4. FICOIDALES.—Flowers regular or nearly so, with numerous petals and stamens. Ovary syncarpous, half superior or superior, 1- or more celled. Styles free, or divided at the apex. Leaves entire, or absent on fleshy stems.

Natural Orders with these Characters.—CACTEÆ (p. 463), FICOIDEÆ (p. 464).

Cohort 5. UMBELLALES.—Flowers regular. Ovary inferior, 2- or more celled. Styles distinct or united at the base. Stamens usually definite.

Natural Orders with these Characters.—UMBELLIFERÆ (p. 464), ARALIACEÆ (p. 469), CORNACEÆ (p. 473).

Division II. *GAMOPETALÆ* or *MONOPETALÆ* (p. 477 to p. 759).

Flowers with both calyx and corolla. Petals more or less united into a 2- or more lobed corolla.

Series I. EPIGYNÆ (p. 477 to p. 571).

Ovary inferior. Stamens usually equal in number to the lobes of the corolla. Mostly herbs, often with milky juice. Shrubs in Caprifoliaceæ and a few Compositæ.

Cohort 1. RUBIALES.—Leaves usually opposite or verticillate. Stamens attached to the corolla (epipetalous). Ovary 2- or more celled, each cell with 2 or more ovules.

Natural Orders with these Characters. — CAPRIFOLIACEÆ (p. 477), RUBIACEÆ (p. 486).

Cohort 2. ASTERALES.—Stamens attached to the corolla. Ovary 1-celled, 1-ovuled.

Natural Orders with these Characters.—VALERIANEÆ (p. 488), DIPSACEÆ (p. 490), COMPOSITÆ (p. 492).

Cohort 3. CAMPANALES. — Stamens usually free from the corolla. Ovary 1- or more celled, each with 1 or many ovules.

Natural Order with these Characters. — CAMPANULACEÆ (p. 555).

Series II. HYPOGYNÆ (p. 571 to p. 759).

Ovary often superior. Stamens free from the corolla, opposite the lobes, or twice or more than twice as many in number.

Cohort 4. ERICALES. — Flowers regular, hermaphrodite. Stamens twice as many as the lobes of the corolla, or equal in number and alternate with them.

Natural Orders with these Characters.—VACCINIACEÆ (p. 571), ERICACEÆ (p. 574), DIAPENSIACEÆ (p. 599).

Cohort 5. PRIMULALES.—Flowers regular, hermaphrodite or polygamous by abortion. Stamens equal in number to lobes or petals of the corolla and opposite them. Ovary 1-celled.

Natural Orders with these Characters. — PLUMBAGINEÆ (p. 600), PRIMULACEÆ (p. 604).

Cohort 6. EBENALES.—Trees or shrubs. Flowers regular, hermaphrodite or unisexual. Stamens equal in number to, or twice as many as, or more than, the corolla lobes. Ovary 2- or more celled.

Natural Orders with these Characters.—EBENACEÆ (p. 632), STYRACEÆ (p. 633).

Cohort 7. GENTIANALES.—Leaves usually opposite. Corolla regular. Stamens alternate with the corolla lobes and equal in number, or if fewer often alternate with the carpels.

Natural Orders with these Characters.—OLEACEÆ (p. 636), APOCYNACEÆ (p. 644), ASCLEPIADEÆ (p. 646), LOGANIACEÆ (p. 648), GENTIANEÆ (p. 650).

****Ovary usually superior. Carpels* 2, *or rarely* 1 *or* 3.

Cohort 8. POLEMONIALES.—Leaves usually alternate. Corolla regular. Stamens alternate with the corolla lobes and equal in number.

Natural Orders with these Characters. — POLEMONIACEÆ (p. 658), HYDROPHYLLACEÆ (p. 666), BORAGINEÆ (p. 670), CONVOLVULACEÆ (p. 682), SOLANACEÆ (p. 687).

Cohort 9. PERSONALES.—Corolla often irregular or oblique. Upper stamen smaller than the others, or often reduced to a staminode or absent.

Natural Orders with these Characters.—SCROPHULARINEÆ (p. 701), LENTIBULARIEÆ (p. 728), GESNERACEÆ (p. 729), BIGNONIACEÆ (p. 731), PEDALINEÆ (p. 734), ACANTHACEÆ (p. 735).

Cohort 10. LAMIALES.—Corolla often irregular, oblique or 2-lipped. Upper stamen often reduced to a staminode or absent. Carpels 1-ovuled or collaterally 2-ovuled. Fruit often enclosed by the calyx, indehiscent.

Natural Orders with these Characters.—SELAGINEÆ (p. 737), VERBENACEÆ (p. 738), LABIATÆ (p. 742).

Division III. *MONOCHLAMYDEÆ*, *INCOMPLETÆ*, or *ACHLAMYDEÆ* (p. 759 to p. 805).

Flowers in which the corolla is usually and the calyx often absent.

(*a*) Flowers hermaphrodite, or unisexual or polygamous in a few genera.

Natural Orders with these Characters.—NYCTAGINEÆ (p. 759), ILLECEBRACEÆ (p. 761), AMARANTACEÆ (p. 761), CHENOPODIACEÆ (p. 765), PHYTOLACCACEÆ (p. 766), POLYGONACEÆ (p. 767).

(*b*) Herbs or shrubs. Ovary apocarpous, syncarpous or monocarpous.

Natural Orders with these Characters.—ARISTOLOCHIACEÆ (p. 772), PIPERACEÆ (p. 773).

(*c*) Ovary usually monocarpous. Trees or shrubs, very rarely herbs. Flowers often hermaphrodite. Stamens perigynous.

Natural Orders with these Characters.—LAURINEÆ (p. 774), PROTEACEÆ (p. 776), THYMELÆACEÆ (p. 777), ELÆAGNACEÆ (p. 779).

(*d*) Trees or shrubs, sometimes herbs. Flowers usually strictly unisexual. Perianth calyx-like, minute or none. Ovary syncarpous or monocarpous.

Natural Orders with these Characters.—LORANTHACEÆ (p. 781), EUPHORBIACEÆ (p. 782), URTICACEÆ (p. 785), PLATANACEÆ (p. 789), JUGLANDEÆ (p. 790), MYRICACEÆ (p. 792), CUPULIFERÆ (p. 793), SALICINEÆ (p. 802), EMPETRACEÆ (p. 804).

Sub-Class II. MONOCOTYLEDONS (p. 805 to p. 972).

The plants belonging to this class have stems without bark, pith, or concentric rings, and do not increase in diameter by annual layers of wood. Leaves usually with parallel veins, but net-veined in AROIDEÆ (p. 953) and SMILACINEÆ (p. 808). Flowers with the parts mostly in threes or fours, never in fives. Embryo with a single seed-leaf (cotyledon). First-formed leaves alternate; radicle not branching, but throwing out adventitious roots.

Division I. *PETALOIDEÆ* (p. 805 to p. 952).

Flowers hermaphrodite, rarely unisexual. Perianth rarely absent, usually in two series; the inner series or corolla usually petal-like; the outer series or calyx often also petal-like.

Series 1.—HYPOGYNAE.—Ovary superior, carpels more or less free and distinct from each other, or completely united.

Natural Orders with these Characters.—NAIADACEÆ (p. 805), ALISMACEÆ (p. 805), COMMELINACEÆ (p. 807) LILIACEÆ (p. 808), JUNCACEÆ (p. 882), PONTEDERIACEÆ (p. 882).

Series 2.—EPIGYNÆ.—Ovary inferior. Flowers regular, irregular, or zygomorphic. Stamens in threes or sixes, sometimes reduced to one only, and sometimes in waxy pollen masses.

Natural Orders with these Characters.—HYDROCHARIDEÆ (p. 883), DIOSCOREACEÆ (p. 884), SCITAMINEÆ (p. 884), HÆMODORACEÆ (p. 889), ORCHIDEÆ (p. 890), AMARYLLIDEÆ (p. 893), IRIDEÆ (p. 916).

Division II. *SPADICIFLORÆ* (p. 952 to p. 956).

Flowers small, usually on a spadix, sometimes solitary, frequently unisexual, but sometimes diœcious. Perianth often wanting, never petal-like.

Natural Orders with these Characters.—TYPHACEÆ (p. 952), AROIDEÆ (p. 953), PALMEÆ (p. 955).

Division III. *GLUMIFLORÆ* (p. 956 to p. 972).

Flowers hermaphrodite or unisexual, and then mostly monœcious, usually in heads or spikelets invested by imbricate bracts. Perianth absent or scaly. Ovary superior, 1- or more celled.

Natural Orders with these Characters.—GRAMINEÆ (p. 956), CYPERACEÆ (p. 971).

SUMMARY OF THE ABOVE

Sub-Kingdom I. FLOWERING PLANTS (p. 131 to p. 1008).

Class I. ANGIOSPERMS (p. 131 to p. 972).

Sub-Class I. Dicotyledons.

- Division (i). Polypetalæ (p. 131 to p. 477).
  - Series (*a*) Thalamifloræ (p. 131 to p. 284).
  - „ (*b*) Discifloræ (p. 284 to p. 322).
  - „ (*c*) Calycifloræ (p. 322 to p. 477).
- Division (ii). Gamopetalæ (p. 477 to p. 759).
  - Series (*a*) Epigynæ (p. 477 to p. 571).
  - „ (*b*) Hypogynæ (p. 571 to p. 759).
- Division (iii). INCOMPLETÆ (p. 759 to p. 805).

Sub-Class II. Monocotyledons.

- Division (i). Petaloideæ (p. 805 to p. 952).
  - Series (*a*) Hypogynæ (p. 805 to p. 883).
  - „ (*b*) Epigynæ (p. 883 to p. 952).
- Division (ii). Spadicifloræ (p. 952 to p. 956).
- Division (iii). Glumifloræ (p. 956 to p. 972).

Class II. GYMNOSPERMS (p. 972 to p. 1008), including GNETACEÆ (p. 972), and CONIFERÆ (p. 972).

Sub-Kingdom II. NON-FLOWERING PLANTS (p. 1008 to p. 1024).
FERNS (p. 1008), HORSETAILS (p. 1023), CLUBMOSSES (p. 1024).

How to use the 'Key.'—It may perhaps be as well to give an idea as to the way in which the 'Key' is to be used for finding out the order, genus, and species to which any particular plant may belong. First of all, the plant should be carefully examined in regard to the roots, stem, leaves, flowers &c., noting size, shape, colour &c., and the 'Key' should then be used in the following sequence, as shown in the summary above. 1. Sub-Kingdom. 2. Class. 3. Sub-Class. 4. Division. 5. Series. 6. Cohort or subordinate group of each series. 7. Natural Order. 8. Genus. 9. Species.

For the sake of example, let the reader assume that he has a Wallflower but does not know that it is a Wallflower. He is then to proceed as follows to find out what it is from the 'Key.'

1. He consults the two sub-divisions of the Vegetable Kingdom ((1) 'Flowering' and (2) 'Non-Flowering' Plants) and decides that it belongs to the flowering one, as it has flowers and is therefore what botanists call a 'Phanerogam.'

2. He then refers to the two 'Classes' of Flowering Plants (Angiosperms and Gymnosperms), and having discovered that the flowers have (i) a distinct perianth, and (ii) ovules (young seeds) enclosed in carpels or pods, the plant is regarded as belonging to the group called 'Angiosperms,' or plants with seeds hidden or concealed within an ovary or fruit.

3. The two sub-classes of Angiosperms, *i.e.* 'Dicotyledons' and 'Monocotyledons,' are next referred to, and as it has (i) net-veined leaves, (ii) bark or rind to the stem, and (iii) the parts of the flower arranged in fours or fives, he places it down as a 'Dicotyledon.'

4. There are three divisions of Dicotyledons: namely, *Polypetalæ* (p. 122), *Gamopetalæ* (p. 125), and *Incompletæ* or *Monochlamydeæ* (p. 126); and it is found that the Wallflower belongs to 'Polypetalæ,' (i) because the flowers have 'both calyx and corolla,' and (ii) because the petals are 'free or distinct from each other.'

5. Polypetalæ is divided into three groups or 'series'—Thalamiflorae (p. 122), Discifloræ (p. 123), Calycifloræ (p. 124), and it will be found that the Wallflower belongs to Thalamifloræ, because (i) the stamens are hypogynous and are inserted on a torus, thalamus, or receptacle, and not on the calyx tube as in Calycifloræ, and (ii) the flowers are not in fives as in most of the Discifloræ.

6. When a series is divided into 'cohorts' or sections the characters of each of these are examined in the same way. The Wallflower evidently does not belong to the cohort 'Ranales,' (i) because the carpels are not free, and (ii) because the stamens are not numerous. But owing to the ovary, or seed pod, being 1-celled, and containing many ovules or seeds, it may be safely assumed to belong to the 'Parietales' group, which has such characters.

7. Under this group there are eight distinct natural orders mentioned. The point now is to find out to which one of them the Wallflower belongs. They are taken in rotation, and the characters of each will be found at the page given in brackets. It is unnecessary to

detail the reasoning process with each order, but the reader may take it for granted or reason it out as above that the Wallflower belongs to the natural order 'Cruciferæ,' because it agrees in the main with all the essential characters of the order as set forth at p. 201, and it cannot be made to fit into any other order.

8. Having found the order, the genus or surname of the plant has next to be found. The genera in each Order follow in natural (not alphabetical) order, and the reader will find that his Wallflower will not fit into the first genus, 'Matthioli' or Stock (p. 201), nor into the second, 'Parrya' (p. 203), but it agrees in almost every detail with the characters of the third genus, 'Cheiranthus' (p. 204). It is therefore placed under that genus and bears its name.

9. The last step in the identification of the plant is to discover what species it is. As there are generally only a few of these in each genus, they have been described in alphabetical order, for the sake of convenience. The characters of each species have been given in sufficient detail to enable the reader to decide for himself which specific (or as it were christian) name he is to apply to the plant. He may regard species in the same light as brothers and sisters, differing from each other in details, but all having the same family or surname.

10. *Varieties.*—Besides the above nine steps to be followed in tracing or running down any plant, it may be added that there are often many 'varieties' or forms of one species (see, for example, *Clematis heracleæfolia*, p. 133). These varieties usually agree in almost every detail with the species, but often have flowers of a different shade of colour, or the leaves may be broader or narrower, hairy or smooth, and so on. Where such characters are constant, a varietal name, often describing the peculiarity, such as *alba*, *rosea*, *purpurea*, *tomentosa*, is sometimes given.

11. *Florists' Varieties.*—What are known as florists' varieties, however, are quite distinct from natural varieties. The custom now is to give popular fancy names to florists' varieties, and they represent often only the slightest variations in colour shades, which may differ with good or bad cultivation, shadow or sunshine &c., and can in no way be kept constant if the plants are increased from seeds.

It therefore matters little what name is given to florists' varieties of such plants as Clematis, Pæonia, Carnation, Pink, Polyanthus, Primrose, Violet, Pansy, Phlox, Pentstemon, Hollyhock, Rose, Dahlia, Chrysanthemum, Gladiolus, and many others, although for the sake of convenience one must use them when they represent really fine garden plants.

THE

HARDY FLOWER GARDEN

DESCRIPTION, CULTURE, AND PROPAGATION OF THE MOST DESIRABLE HERBACEOUS AND ALPINE FLOWERS, ORNAMENTAL AND FLOWERING TREES AND SHRUBS, BAMBOOS, FERNS, &c., SUITABLE FOR THE OPEN AIR IN THE BRITISH ISLANDS.

Division I. *POLYPETALOUS DICOTYLEDONS*

Series I.—THALAMIFLORÆ (see p. 122).

I. RANUNCULACEÆ—Crowfoot or Buttercup Order

Chiefly herbaceous plants, rarely shrubs, with alternate or opposite (as in *Clematis*) and generally much-divided leaves, the stalks of which are dilated at the base, forming a sheath half clasping the stem. Flowers regular or irregular, with 3–6 hypogynous deciduous sepals, usually imbricate in bud. Petals 3–15, hypogynous, in one or more rows, sometimes assuming very remarkable forms, as in Larkspur (*Delphinium*), Columbine (*Aquilegia*), and Monkshood (*Aconitum*). Stamens usually numerous, hypogynous. Carpels numerous, one-celled, free, or occasionally united into a many-celled pistil. Fruit either consists of dry, indehiscent achenes, as in Buttercup; or berries, as in Baneberry; or follicles, as in the Pæony.

The order contains about 1,000 known species, chiefly natives of damp, cold climates. A few are found in the tropics, but at very high elevations.

CLEMATIS (TRAVELLER'S JOY; THE VIRGIN'S BOWER).—A genus of shrubs which creep or climb by their leaf-stalks, and have opposite compound leaves, without stipules. Calyx consists of 4 petal-like sepals (garden forms have more) usually valvate. There is no corolla, and the fruit is a head of sessile or stalked achenes, with long, generally feathered awns or styles, which give the plants a beautiful appearance even in winter.

Culture and Propagation.—Clematises like a rich loamy soil with a certain amount of chalk or lime, and are benefited by a mulching of good rotten manure in autumn. The plants are very ornamental trained over walls, trellises, arbours, &c. They may be propagated by sowing the seeds in spring in light sandy soil, in gentle heat; or in cold frames as soon as ripe, afterwards pricking the seedlings out and giving more space for a sturdy development. Planting out may take place in spring or early in autumn. Clematises may also be increased by layers outside put in at any time, but care must be taken that they are not separated from the parent plants until well rooted.

Cuttings may also be made from the young shoots, cut almost to every eye and placed in a hotbed in sandy soil early in spring. The garden hybrids are generally grafted in spring on the roots of such species as *C. Vitalba*, *C. Viticella* and *C. Flammula*, but unsatisfactory results often follow owing to an imperfect union between stock and scion, and also perhaps because growth in spring begins, or tries to begin, in one before the other. If the scion, for example, would naturally start into growth on its own roots a week or so in advance of the stock, it is easy to see that trouble would arise from this cause; and the same with the stock starting into growth before the scion was naturally ready to absorb the sap. Increase by cuttings and layers is now more general in many places, but many kinds also admit of being divided at the root in spring or autumn in favourable weather.

C. æthusifolia. — A graceful climber, 4–6 ft. high, from N. China, with small twice or thrice pinnatisect leaves with narrow linear lobes. The bell-shaped or tubular flowers are half an inch or more long, yellowish-white, and are produced in great profusion in summer. The variety *latisecta* is distinguished from the type by its larger leaf segments.

Culture &c. as above.

C. alpina (*Atragene alpina; A. austriaca; A. sibirica*).—A pretty climber from the mountains of Europe. The biternate leaves have ovate-lance-shaped, pointed, serrate leaflets. Flowers in May vary from blue to white; petals 10–12, linear at the base, dilated at the apex. There is a white-flowered variety named *alba*.

Culture &c. as above.

C. apiifolia.—A vigorous species about 10 ft. high, native of China and Japan. It has ternate leaves, and dull white flowers, 3–4 in. across, in August and September.

C. brevicaudata (or *C. Pieroti*), with pinnate or twice ternate leaves, and small white flowers, is very near this.

Culture &c. as above.

C. aromatica (*C. cærulea odorata*).—A slender sub-shrubby species, 4–6 ft. high, probably of hybrid origin between *C. integrifolia* and *C. recta*. The leaves have five shortly stalked or almost sessile lobes more or less ovate-oblong in shape. The sweet-scented solitary flowers appear in summer and are about 2 in. across and of a deep violet-blue.

Culture &c. as above.

C. cærulea (*C. azurea grandiflora*).—A Japanese species with spreading hairy ternate leaves, having ovate-acute entire leaflets. The large violet-coloured flowers with deep purple stamens are produced about June and July.

Many garden forms have originated from this species.

Culture &c. as above.

C. calycina (*C. balearica*, A. Rich).—This species—a native of Corsica and Minorca—is hardy only in the south of England and the milder parts of the British Isles. The ternate leaves have 3-lobed stalked and deeply toothed leaflets, which in winter assume a fine bronzy tint. The greenish-yellow bell-shaped flowers are about 2 in. across, and heavily spotted with reddish-purple. They are produced from January to April in clusters of four or five and look very attractive at that season.

Culture and Propagation. — This species should be sheltered by growing on a south wall. It likes a rich loamy soil, and is best left to ramble about at will, as it dislikes the use of the knife. The foliage is evergreen, and during the autumn and winter months may be used for room decoration with flowers, owing to its rather attractive tints.

C. campaniflora. — A Portuguese climber, 12–18 ft. high, having biternately cut leaves, subdivided into about twenty-four entire or 3-lobed leaflets. The pale violet or white bell-shaped flowers are about one inch across, and are freely produced in June and July.

Culture &c. as above.

C. cirrhosa (*C. balearica*, Pers.).—An evergreen climber 8–10 ft. high. Native of Spain, Algiers, and the mountains of N. Africa. Leaves ovate, somewhat heart-shaped, toothed. Flowers dull white or cream-coloured, about 1½ in. across, downy outside, smooth within, produced in drooping clusters about March and April.

Culture &c. as above.

C. coccinea (*C. texensis*).—A beautiful species from Texas, with stems 6–10 ft. high, which in this country usually die down in winter. The flowers vary in colour from crimson to scarlet, and are swollen at the base, the tips of the 4 leathery sepals being recurved. They appear during the early summer months and at once attract attention by their vivid colour. This species has been used in the production of various hybrids. The variety *major* has larger flowers than the type.

Of late years several beautiful hybrids between this and some of the leading hardy kinds have been raised by Messrs. Jackman, of Woking, the most notable being 'Countess of Onslow,' 'Duchess of York,' and 'Duchess of Albany.' All were figured in the 'Garden' for October 16, 1897.

Culture &c. as above.

C. connata.—A beautiful Himalayan climber with woody stems and coarsely toothed leaflets 3–5 in. long, and sometimes more or less 3-lobed. Flowers in autumn, bell-shaped, clear yellow, recurved at the tips.

Culture &c. as above.

C. crispa (*C. cylindrica; C. Simsii*).—A hardy evergreen from N. America, 3–4 ft. high, with purplish stems. Leaves entire, 3-lobed or ternate, acute. The nodding pale lilac, white, or purple fragrant flowers appear from June until the autumn. There seems to be great variation in the leaves and colour of the flowers of this species.

Culture &c. as above.

C. Douglasi. — Although discovered many years ago on the Rocky Mountains, this species is not yet well known in British gardens. The flowers are about an inch long, bell-shaped, and recurved at the tips, deep purple within, paler outside. They are produced in summer.

Culture &c. as above.

C. Flammula.—This native of Southern Europe is one of the oldest Clematises in cultivation, and at the same time one of the most vigorous and free-flowering of climbers. Leaves pinnate, smooth, with roundish, oval, oblong, or linear entire or 3-lobed deep green leaflets, which remain on the plants well into the winter. The creamy white, fragrant flowers are less than an inch across, and appear in late summer and autumn, giving place to white and feathery fruits.

Culture &c. as above.

C. florida.—A Japanese species 9–12 ft. high, with ternately decompound leaves, and ovate-acute entire leaflets. When fully open the creamy white solitary flowers, consisting of 6 or 8 oval lanceolate sepals, are from 2–4 in. across with purple stamens in the centre. They appear from April to September.

There is a well-known and beautiful form with double flowers.

Culture &c. as above.

C. Fortunei.—A splendid species, also from Japan, with leathery trifoliate leaves, and roundish heart-shaped leaflets. The white fragrant flowers, about an inch across, consist of numerous oblong-lanceolate stalked segments, and appear during the summer months.

Culture &c. as above.

C. Fremonti.—A dwarf species 1–2 ft. high, from North America. The rarely branched stems bear numerous unstalked leathery leaves, 3–4 in. long, and drooping purple flowers recurved at the tips produced during the summer. The tails or awns of the fruits are downy when young.

Culture &c. as above.

C. fusca. — A somewhat shrubby species from N. Asia with prostrate rather than climbing stems, 6–8 ft. long. The reddish-brown bell-shaped flowers appear in summer and are covered with a short thick brownish wool. The hairy fruits form a globular head about one inch in diameter.

Culture &c. as above.

C. Hendersoni (*C. eriostemon*).—This is supposed to be a hybrid between *C. Viticella* and *C. integrifolia*, and originated at Mr. Henderson's nursery, St. John's Wood, in 1835. It reaches a height of 8–10 ft. and produces from June to September deep blue, faintly perfumed flowers over two inches across.

Culture &c. as above.

C. heracleæfolia (*C. tubulosa*).—*Hyacinth Clematis.*—A dwarf, sturdy species from N. China, with more or less trailing stems, large lobed leaves, and short stalked corymbs of purplish-blue tubular flowers, like those of a Hyacinth, produced during the summer and early autumn months.

The variety *davidiana* is often regarded as a species. It has trailing stems 4–5 ft. long, and large ovate leaflets often about 6 in. long. Flowers tubular, bright lavender-blue, about ¾ in. long, the tips of the petals reflexed.

The variety *Hookeri* has large pinnately 3-foliolate leaves with elliptic acute toothed leaflets, and tubular lilac flowers.

Culture &c. as above. The plants are readily increased by division of the roots in spring.

C. indivisa. — A charming New Zealand species growing several feet high, having dull green or purplish stems and ternate leaves, the latter being composed of 3 oblong ovate leathery deep green smooth leaflets 2½–3 in. long. The pure white starry flowers, about 3 in. across, and consisting of 6–8 oblong sepals surrounding a cluster of greenish or yellowish-white stamens, appear out of doors in April and May, but in February if the plants are grown in greenhouses. They are borne in loose panicles, sometimes as many as 20 in one truss. The variety *lobata* has flowers exactly like those of the type, but it is readily recognised by means of its more or less lobed or sinuated leaflets.

Culture and Propagation.—Unfortunately this fine species is hardy only in the mildest parts of the south and west, but in other parts of the kingdom it is well worth growing in a cool greenhouse for the sake of its attractive flowers. It likes a rich sandy loam and warm situations out of doors, and is usually increased by grafting upon stocks of the Common Traveller's Joy (*C. Vitalba*). Cuttings of the half-ripened shoots, however, will root readily in early summer if placed in sandy soil in gentle bottom heat in a hotbed or greenhouse. Amateurs will probably find it more convenient to obtain established plants from a nurseryman. Pruning, if necessary, is best done immediately flowering has ceased, and not while new growths are being made.

C. integrifolia.—A European species with erect stems 2–3 ft. high. Leaves unstalked, 2–4 in. long, entire, ovate-lanceolate. The drooping blue flowers are borne singly from June to August near the top of the stems in the axils of the united and cup-shaped leaves.

The variety *Durandi* has 5-nerved leaves 4–5 in. long, with a purplish downy margin, and purple beneath. Flowers deep violet-purple, each sepal with a prominent deeper coloured keel behind. Stamens in a thick cylindric silky cushion, white and yellow.

Culture &c. as above.

C. lanuginosa.—A fine Chinese species 5–6 ft. high. Leaves usually simple, broadly heart-shaped, acute, smooth above, with a greyish wool on the under surface. The solitary flowers appear early in summer, lasting till autumn, and are 6–7 in. across, with 6 or 8 spreading and overlapping sepals of a pale lavender, pure white or deep rich purple colour.

The variety *pallida* has flowers 9–10 in. across.

C. lanuginosa is the parent of many of the most beautiful garden hybrids described below.

Culture &c. as above.

C. ligusticifolia.—A species with stems about 30 ft. long, from North America. Leaves composed of 5 leaflets, each 1½–3 in. long, 3-lobed or very coarsely toothed. Flowers white, about ¾ in. across, are produced in summer, the pistillate or female flowers being on one plant, and the staminate or male on another.

Culture &c. as above.

C. montana (*C. anemonæflora*).—This beautiful and well-known species is a native of the Himalayas. Its stems will cover walls to a height of 20 ft. or more, and are furnished with smooth ternate leaves, with oblong toothed and pointed feaflets. During April and May the large white flowers are produced in great profusion, either singly or several together, and almost cover the foliage with a sheet of white.

Culture &c. as above. This species will flourish under almost any circumstances and in any soil.

C. ochroleuca. — A native of the Eastern United States, with stems 1–2 ft. high, and entire ovate leaves, the younger ones being silky beneath. Flowers in summer, solitary, cream-coloured within, yellowish outside.

Culture &c. as above.

C. orientalis.—A native of India and W. Asia, requiring some protection in this country during severe winters, especially in the less favoured parts. The stems climb from 12 to 30 ft. Leaves pinnate with smooth wedge-shaped leaflets having pointed lobes. Flowers in August and September, greenish-yellow, sweet-scented, tinged with russet, and borne in great abundance. The fruits have elegant silky tails. This species is also known as *C. graveolens*, a name having reference to the rather heavy odour of the blossoms.

Culture &c. as above. Easily increased by cuttings or seeds.

C. Pallasi. — A pretty plant 3–4 ft. high with trailing stems, pinnate leaves and shortly stalked, ovate, lance-shaped, acute, leathery leaflets 1–1½ in. long, with sunken veins. Flowers in June, white with greenish-yellow stamens, and oblong spoon-shaped sepals.

Culture &c. as above.

C. paniculata. — A Japanese species the stems of which attain a length of about 30 ft. Leaves pinnate with entire oval heart-shaped acute leaflets. From July to September the dullish white flowers, which resemble those of *C. Flammula*, and have a Hawthorn- or Daphne-like fragrance, are produced in many-flowered panicles.

Culture and Propagation.—This plant does best trained against a sunny wall, or for covering old tree stumps, pillars &c., in warm southern parts. The stems may be cut down to within a foot or so of the ground in winter to keep the plant within bounds.

C. patens.—Also a native of Japan, 6–10 ft. high with leaves composed of 3–5 segments smaller and narrower than in *C. lanuginosa* to which it is akin. Flowers in May and June, with 6–8 delicate mauve sepals.

Many garden varieties, some of which are mentioned below, have larger flowers with white, deep blue, or violet sepals.

Culture &c. as above.

C. Pitcheri (*C. coloradensis*). — A pretty and distinct plant 9–12 ft. high, native of Colorado and Western America. Its leaves consist of 3–9 ovate or heart-shaped, entire or 3-lobed leaflets, the uppermost leaves being often simple. The dull purplish, bell-shaped flowers, each about 1 in. long and ¾ in. wide at the swollen base, appear during July and August, and have narrow recurved sepals, the tips of which are often yellow. The reddish-purple fruits have thread-like tails slightly silky.

The variety *lasiostylis* is distinguished by the recurved sepals being tipped with deep purple-blue and by the deeper coloured and more hairy fruits; and *Sargenti* is a small-flowered form of the type.

Culture &c. as above.

C. recta (*C. erecta*).—A species with erect herbaceous stems 2–3 ft. high, native of Southern and Eastern Europe. The pinnate leaves have entire, ovate, pointed, stalked leaflets. Flowers from June to August, numerous, in dense corymbs, white and sweetly scented, each about an inch across. The variety *flore pleno* is not often seen. It differs in having double flowers in rather denser clusters.

Culture &c. as above. This species may be increased by dividing the roots.

C. reticulata. — A climber from the S. United States with leathery prominently net-veined leaves; the upper ones simple elliptic; lower ones pinnate with 7–9 variable leaflets. Flowers in September, dull green outside, purple within, solitary, drooping on long stalks. Sepals united, recurved at the tips, and thick and fleshy in texture.

Culture &c. as above.

C. rhodochlora. — A garden variety with simple broadly oval, or somewhat heart-shaped shortly stalked leaves. Flowers about 2 in. across, with 2 small wine-red sepals and 2 large green ones.

Culture &c. as above.

C. Robertsiana. — This species has only recently been discovered 10,000–11,000 ft. up on the mountains of Afghanistan, and is probably not yet in cultivation. Flowers solitary, 3–5 in. across, pale lemon-yellow, closely resembling *C. alpina* in shape.

Culture &c. as above

C. Stanleyi. — A remarkable species 2–3 ft. high, native of S. Africa. It is shrubby rather than climbing in habit, and the stems die down to the ground every winter, new ones sprouting up in spring. The leaves are twice pinnate with variously cut lobes, and are mostly covered with soft silky white hairs, although a few leaves are greenish but hairy. The flowers are produced during the summer months in the axils of the leaves, and vary from 2 to 3 in. across, the sepals being at first cup-shaped, but afterwards spreading out flat. They vary in colour from deep violet or puce to rose-purple, and almost white, and are in strong contrast to the large bunch of bright yellow stamens in the centre. When in fruit the plants present an elegant appearance, owing to the long silvery-white tails resembling miniature ostrich feathers.

Culture and Propagation. — In mild winters this species is fairly hardy as far north as the Thames Valley, but it is safer to protect the roots with a layer of dry leaves, litter, bracken &c. in the event of severe weather. Seeds are freely produced and may be sown in cold frames as soon as ripe, although they may not sprout freely until the following spring. The seedlings must be pricked out and grown on until the following spring, so that strong sturdy plants will be ready for planting out. Established clumps may be carefully divided at the roots.

C. Stans.—A striking Japanese species with herbaceous stems 4–5 ft. high and dark green downy leaves, with roundish toothed leaflets, more or less 3-lobed. Flowers in September and October in terminal panicles or clusters in the axils of the leaves, each about ¾ in. long, pale blue, more or less bell-shaped, and Hyacinth-like.

Culture &c. as above.

C. verticillaris (*Atragene americana*). A native of N. America with stems 10 ft. or more in length. Leaves whorled, in fours, with stalked heart- or lance-shaped pointed leaflets, somewhat lobed or serrated. Flowers in May, 2–3 in. across, purplish-blue, with acute sepals.

Culture &c. as above.

C. Viorna (*Leather Flower*).—This N. American species attains a height of 10 to 12 ft. and is not a particularly vigorous grower. The smooth pinnate leaves have entire 3-lobed or ternate leaflets, ovate-acute in shape. About June the drooping balloon-shaped flowers appear, having thick leathery connivent sepals of a dull reddish-purple, and reflexed at the tips.

Closely related to this species is *C. Addisoni*, a native of the Alleghany mountains. It has dark violet-purple sepals, with reflexed yellow tips.

Culture &c. as above.

C. virginiana.—This is the common Virgin's Bower of the United States and Canada. Its stems reach a length of 15 to 20 ft., and bear ternate leaves with heart-shaped, acute, largely toothed or lobed leaflets. The small white fragrant flowers appear from June to August, and like *C. ligusticifolia* the male and female flowers are borne on separate plants.

Culture &c. as above.

C. Vitalba (*White Vine; Old Man's Beard; Traveller's Joy, &c.*).—This is the only Clematis really indigenous to England, but does not appear to be a native of Scotland or Ireland. It climbs luxuriantly in hedges and thickets, and is most common on chalky soils. The pinnate leaves have ovate, heart-shaped, entire toothed or lobed leaflets. The greenish-white scented flowers are about an inch across, and are produced from July to September. The fruits have a white feathery tail an inch or so in length, and these give the plants a very attractive appearance late in the year, and during the winter months.

In the Duke of Rutland's garden at Belvoir Castle there is a specimen 20 ft. high and 30 ft. in diameter.

Culture &c. as above.

C. Viticella (*Vine Bower*).—An elegant twiner 8–12 ft. high, and native of S. Europe and Western Asia. The leaves are entire or ternately decompound with entire lobes. The drooping blue, purple, or rose-coloured flowers, each about 2 in. across, are borne in summer. There are now many varieties of this species with many shades of colour, and most of them are superior to the type. The form called *magnifica* has purple flowers about 4½ in. across.

Culture &c. as above.

HYBRID CLEMATIS.—By means of fertilising the carpels of one species with the pollen from another, gardeners have succeeded in raising a vast number of hybrids or cross-breeds, many of them being of the greatest value for the flower garden, and superior to any of the species found in a state of nature. (See Hybridisation, p. 37.)

It is, however, not only impossible but quite unnecessary to give a long list of the various hybrids here, as new names are continually being added, often without any justification, whenever the slightest change of colour is noticed.

Special mention must be made of the beautiful *Clematis Jackmanni* and its many forms. This fine hybrid was raised by Mr. George Jackman of Woking, and first flowered about 1862. It is one of the earliest and best, and its large deep violet-purple flowers with 4–6 sepals are produced during the summer and autumn. The two species concerned in its production were *C. Viticella* and *C. lanuginosa*, natives of widely different parts of the Old World. The species chiefly concerned with the other garden varieties are given below in sections, and it will be seen that only a few have yet been utilised by the hybridiser out of the many kinds described above.

The following is a list of the best kinds for the flower garden. They are arranged in the botanical sections to which they belong, and the usual period of flowering is given, so that a succession of kinds may be arranged. The culture and propagation are as described above under the genus, p. 131.

'FLORIDA' SECTION

The following produce large handsome double flowers in summer from the old or ripened wood. Care must therefore be taken, when pruning or thinning, not to cut the ripe wood away.

Belle of Woking, beautiful silver-grey, June.

Countess of Lovelace, bright bluish-lilac, very fine, June.

Duchess of Edinburgh, pure white, deliciously scented, June and July.

John Gould Veitch, lavender.

Lucie Lemoine, white, with the centre in the form of a rosette.

'JACKMANNI' SECTION

These are all summer and autumn bloomers, flowers mostly large, produced in masses on the current year's shoots.

Alexandra, pale reddish-violet, very free.

Gypsy Queen, dark velvety purple, attractive.

Jackmanni, intense violet-purple, a universal favourite.

Jackmanni alba, a tinted white var., very beautiful.

Jackmanni '*Snow White*,' pure white, free.

Jackmanni superba, very dark violet-purple, larger and of deeper colour than *Jackmanni*, very profuse bloomer.

Madame Ed. André, a free and distinct variety with velvety-red flowers.

Madame Grange, flowers crimson-violet, with red bar in centre, a rich colour, sepals prettily crimped at the edges.

Prince of Wales, deep purple.

Star of India, reddish-violet, with purple tinge and red bars.

'LANUGINOSA' SECTION

These flower summer and autumn, producing their large flowers in succession on short lateral shoots.

Alba Magna, a very large white-flowered variety of free growth.

Beauty of Worcester, double and single flowers of a lovely bluish-violet, with white stamens.

Blue Gem, pale blue.

Excelsior, rich deep mauve.

Fairy Queen, pale flesh with pink bar.

Henryi, large creamy white, finely formed, one of the best white autumn-flowering Clematises.

La France, deep violet-purple, dark anthers, large and vigorous.

Lady Caroline Neville, delicate bluish-white with mauve bars, large and finely formed.

Marie Lefebvre, a fine mauve variety with single flowers.

Mme. Van Houtte, white suffused mauve, free-flowering and a strong grower.

Mrs. Hope, silvery-mauve.

Nivea, large white, fine.

Otto Frœbel, greyish-white.

Princess of Wales, deep bluish-mauve, with satiny surface, very fine.

Purpurea elegans, deep purple.

'PATENS' SECTION

These produce their large flowers in spring and summer, on the old ripened wood, a fact to be borne in mind when thinning out.

Lady Londesborough, bluish-lilac, with pale purple bar.

Miss Bateman, white, chocolate-red anthers.

Mrs. George Jackman, satiny white with a creamy bar, flowers large and produced in profusion spring and autumn.

'VITICELLA' SECTION

These varieties flower during the summer and autumn in profuse masses.

hybrida Sieboldii, lavender.

Lady Bovill, flowers greyish-blue, cup-shaped, fine.

rubra grandiflora, bright claret-red, profuse bloomer.

THALICTRUM (MEADOW RUE).—A genus embracing about fifty species of hardy herbs with perennial stems, nearly all natives of the North temperate and frigid regions. The leaves are ternately decompound, and usually elegant in appearance; when present on the stems, alternate. Flowers green, yellow, purple, or white, often polygamous, borne in panicles or racemes, usually small, with the stamens conspicuously protruding.

Involucre and petals absent. Sepals 4–5, petal-like. Carpels numerous. Fruit an achene, often stalked and compressed.

Culture and Propagation. — The Meadow Rues will grow well in any ordinary garden soil, and are easily multiplied by dividing the rootstocks in autumn or spring.

When grown in masses or clumps in the border or rock garden, they lend a light and feathery grace to the surroundings. For cutting purposes the foliage and flowers are very useful when mixed with larger and more showy blossoms. Seeds may be sown out of doors or in cold frames as soon as ripe, or in spring, afterwards pricking the seedlings out in mild, showery weather.

T. **alpinum.**—This is a native of the British Isles, although somewhat rare in Ireland in a wild state. It will thrive in marshy or boggy places and requires peaty soil. The foliage is glaucous beneath, and the purplish flowers with drooping stamens appear in July and August.

Culture &c. as above.

T. **anemonoides** (*Rue Anemone*).—This N. American species has a stem about 6 in. high arising from a cluster of thickened tuberous roots. The white flowers appear in April and May, and have yellowish stamens. The leaves are 2–3-ternate with roundish somewhat 3-lobed leaflets on long stalks. A useful rock plant. There is a double variety with smaller flowers.

Culture &c. as above. This species is often called *Anemone thalictroides.* It is as a rule best raised from seeds, owing to the fact that if established clumps are divided they often take a long time to recover themselves. A partially shaded situation in the rockery, such as under a jutting boulder of rock, and a deep moist peaty soil suit it admirably.

T. **angustifolium.** — A pretty species 3-4 ft. high, native of W. Europe, having masses of light and graceful, deeply cut foliage. The clear greenish-yellow flowers are produced in feathery clusters in June and July, and give the whole plant a fine effect.

Culture &c. as above.

T. **aquilegifolium** (*Feathered* or *Tufted Columbine*). — A native of Europe and Asia with purple mealy pipe-like stems 1–3 ft. high. Leaves like those of the Columbine, thrice pinnate with rounded, smooth deeply toothed leaflets. Flowers in early summer. Sepals white, fleeting; stamens usually purple, sometimes white.

The variety ***atropurpureum*** has dark purple stamens and stems; the variety *formosum* dark purple stamens, dilated at the apex; and the variety ***roseum*** has rose-coloured sepals.

Culture &c. as above.

T. **Chelidoni.**—A pretty little species about 6 in. high, native of Thibet. The twice ternate leaves are divided into downy and roundish 3-lobed and toothed leaflets each ½–¾ in. across, and the lilac-purple flowers with a bunch of yellow stamens in the centre droop from thread-like stalks in August, like those of *T. Delavayi.*

Culture &c. as above. This is a pretty rock plant, but to be effective should be grown in bold masses.

T. **Delavayi.** — A charming Chinese species 2–4 ft. high, with pinnate leaves ternately divided into roundish and somewhat 3-lobed and toothed leaflets. The flowers appear during the summer months gracefully drooping or nodding from the ends of slender thread-like stalks. They are lilac-purple in colour with a large bunch of yellowish stamens in the middle, and in conjunction with the elegantly cut foliage look extremely handsome.

Culture &c. as above.

T. **flavum** (*False Rhubarb; Fen Rue*).—A native of the British Islands, growing in wet places, and worthy of a place among marsh or bog plants in the garden. The stout stems arise 2–4 ft. high from a yellow creeping rootstock, and bear ternately 2–3-pinnate leaves, with 3-lobed leaflets 1–1½ in. long. Flowers pale yellow, anthers bright yellow, produced in July and August.

Culture &c. as above.

T. **fœtidum** (*Fetid Meadow Rue*).—A native of Europe and Asia, about 1 ft. high. Leaves decompound clothed with a clammy pubescence, 2–3-pinnate, with roundish heart-shaped leaflets, 3-5-lobed at apex. Flowers small, nodding, produced in early summer in an erect, spreading panicle. Sepals reddish outside; anthers yellow.

Culture &c. as above.

T. **glaucum.**—A South European species, with round, erect, striped and mealy stems 2–5 ft. high. The leaflets are ovate, rounded, 3-lobed, the lobes deeply toothed. In June and July the flowers, having four or five yellow sepals, are borne on erect, compound panicles.

Culture &c. as above.

T. minus (*Maidenhair Meadow Rue*). A native of the British Isles, growing in dry places. The stems vary from 6 in. to 4 ft. high, stout, rigid, often zigzag, striped more or less throughout, and usually furrowed when dry. Leaves Fern-like, cut into numerous small smooth roundish glaucous leaflets, toothed at the apex. Flowers in summer, small, and drooping in a loose panicle. Sepals yellowish-green or pale purple with white edges.

Owing to the beautiful frond-like foliage of this plant, it is suitable for rockeries, borders, and even as a pot-plant. For mixing with cut flowers in vases, the foliage is very ornamental, and lasts much longer than Maidenhair Fern.

Culture &c. as above.

T. petaloideum.—A Dahurian species with round almost naked stems about 18 in. high. Leaves ternately cut, with smooth, ovate, obtuse, entire or 3-lobed leaflets. Flowers produced in corymbs in June and July, with white, nearly round sepals, flesh-coloured filaments, and yellow anthers.

Culture &c. as above.

T. rhynchocarpum.—A very remarkable and handsome species, about 3 ft. high, native of the Transvaal. The foliage resembles some of the finer forms of the Maidenhair Fern. The flowers are borne in large panicles during the summer months, and are succeeded by the fruits, which are borne on long stalks and present a novel and attractive appearance.

Culture and Propagation. — This species likes a warm, moist, and shaded spot in the rockery, and will not flourish in strong sunshine. The soil must be well drained, and a little protection in winter may be necessary. Increased by seeds and division.

T. tuberosum. — A Spanish species about 12 in. high, with 2-3-pinnate crowded leaves, and smooth roundish 3-lobed leaflets. Flowers borne in loose corymbs in June, and having 5 white oval, blunt sepals.

Culture &c. as above.

ANEMONE (WIND FLOWER).—The generic name is derived from *anemos*, the wind, in allusion to the light and feathery seeds of some species which are easily blown about by the wind.

A genus of about 70 species of ornamental hardy perennials, with radical leaves much cut or lobed. There is an involucre of 3 cut leaflets some distance from the flower. Sepals 4–20 petal-like. Petals absent, or consist of the outer stamens changed into stalked glands.

The sub-genus Hepatica is now included in Anemone, and may be distinguished by having an involucre of 3 entire leaflets just under the flowers, and a calyx of 6–9 petal-like sepals.

Culture and Propagation. — Anemones are best grown in a rich sandy loam, but most of them will thrive in ordinary garden soil. Where special treatment is required for any particular species, directions will be found in the proper place.

There are various methods of increasing Windflowers, and although division of the rootstock and cuttings of the roots are employed in autumn or early spring, most of the species may be obtained from seeds. These should be sown as soon as ripe in pans or boxes, and may be protected in a cold frame. The other directions given under Seed Sowing at p. 42 will be found useful.

A. alba.—A Siberian species about 6 in. high, with ternate or quinate leaves, purple on the underside; segments deeply toothed at top. Flowers in June, white, rising singly above the leaves, and having 5 obovate, concave sepals. May be used in borders or rockeries, in deep fibrous loam. Increase by seed or division.

Culture &c. as above.

A. albana.—A handsome and distinct dwarf species 4–6 in. high, found in a wild state from the borders of Armenia across Central Asia to Siberia, growing on the mountain sides. The nodding cup-shaped flowers are produced very freely in April and May, and although only of a dullish yellow, they look very handsome over the green carpet of foliage. After the flowers have withered, the seed-heads present a very ornamental appearance. Forms with purple or violet flowers have been recorded, but do not appear to be in cultivation.

Culture and Propagation. — This species grows well either in the ordinary flower border, or in the rockery in ordinary garden soil. It prefers an exposed sunny spot, and will live for several years without being disturbed. Seeds ripen freely and may be sown as soon as ripe in cold frames. The young plants are pricked out and grown on but will not begin to flower until the third year, according to Mr. Wolley Dod.

A. alpina (*Pulsatilla alpina*).—A very handsome alpine species from the mountains of Central Europe, growing from 6 to 24 in. high. Leaves biternate with pinnate and deeply serrated lobes, sometimes smooth, and sometimes covered with long crowded silky hairs. Flowers produced in May, with 6 spreading elliptic sepals varying in colour from white to cream, white and purple, and yellow.

The variety *sulphurea* has soft yellow cup-shaped flowers, 2–3 in. across when fully expanded, the sepals having a silky down outside. The white-flowered form of *A. alpina* is a vigorous plant and delights in rich loam, peat and leaf soil, with the addition of a little lime rubble.

Culture &c. as above. The best way to increase this variety is to sow seed as soon as ripe in a rather moist peaty bed and allow the seedlings to remain for one or two seasons, and then transplant in the spring to a fully exposed, well-drained and moist position. A little lime rubble or old mortar mixed with the soil is usually beneficial to *A. alpina* and its varieties.

A. angulosa (*Hepatica angulosa*).—A beautiful species from Transylvania, 6-12 in. high, with leaves 3 in. broad, palmately 5-lobed, the lobes coarsely toothed. Flowers in February and March, 2 in. across, of a fine sky-blue, with numerous black anthers surrounding a tuft of yellow styles. Suitable for partially shaded places in the rock garden, margins of borders, shrubberies &c., in deep rich soil. There is a fine variety called *atrocærulea* with large deep purple-blue flowers.

Culture &c. as above. Increase by seed or division.

A. apennina (*Apennine Windflower*). A tuberous blackish-rooted species from S. Europe, growing about 6 in. high. The leaves of the stem are in whorls of 3, ternate with long blunt lobes, all somewhat pubescent; the root-leaves biternate. Flowers about 2 in. across, bright sky-blue, appear on single stalks in March. There is a white (*alba*) and also a rose-coloured (*rosea*) variety.

Culture &c. as above. This species prefers sandy loam or peat, and thrives under the partial shade of trees. It makes a beautiful carpet of blue, and should be grown for this purpose in large patches. Increased by division.

A. baldensis.—A rare tuberous-rooted species about 6 in. high, native of Switzerland. The leaves are twice ternate with many-parted linear-lobed segments. The solitary flowers appear in May, and have 8–10 oblong oval sepals, white, hairy outside, and reddish tinged with blue.

Culture &c. as above. Shady parts of the rockery suit it best.

A. blanda (*Blue Winter Windflower*). A lovely tuberous-rooted species from Greece. It grows about 6 in. high and closely resembles *A. apennina.* Leaves 3-partite or cut, with stalked or sessile 3-partite, cut segments; those of the involucre deeply cut and stalked. The deep blue flowers, each nearly 2 in. across, appear in winter or early spring, having 9–14 oblong linear sepals. The variety *scythinica* from N. Kurdistan has pale blue and white flowers.

Culture &c. as above. This species likes a rich, light, and well-drained loam and a warm sheltered place in rockeries sunny banks, or warm grassy slopes. Increase by seed or division.

A. coronaria (*Poppy Anemone*).—This is an important species, inasmuch as it has given rise to the many single and double florists' varieties which appear in such abundance in the early spring and summer, are so varied in colouring, and so popular in price. The typical species grows about 6–9 in. high, and has ternate deeply cut leaves with numerous narrow pointed segments. The flowers have 6 oval rounded sepals varying from red to white, purple and pink. It is a native of S. Europe.

Culture and Propagation.—The Poppy Anemone thrives in warm deep loam. The roots of the more select varieties may be taken up when the leaves wither, and planted at intervals in September and October or from January to March to secure a succession of flowers. If allowed to remain in the ground, however, it often happens that the warm rains of late summer will cause the plants to grow and flower again later in the year if the weather is mild.

Seeds, which should be selected from the finest varieties, may be sown as soon as ripe in a spot where it will be possible to afford shade and moisture—the essentials to a rapid germination. The seedlings may be allowed to flower where sown or transplanted in September or October.

Among the many forms of the Poppy Anemone the following deserve special mention:

1. *The Chrysanthemum-flowered Anemone.*—This is a fine race of double-flowered Anemones, having the appearance of some Chrysanthemums or China Asters. There are many varieties, chiefly distinguished by colour, which varies a good deal, the principal tint being lilac-rose, deep violet, crimson, carmine, rose, purple, &c.

2. *Caen Anemones.*—These are well known by their vigorous growth, the great size of their flower stalks, and their large and brilliantly coloured flowers. Both single and double varieties are represented. The 'Cardinal's Hat' and 'Double Nice' Anemones are particularly fine forms, the first being deep scarlet with slight variations, the second of a beautiful rosy flesh colour.

A. decapetala.—A distinct N. American Windflower 12–18 in. high, with deep green 3-parted leaves, the lobes of which are cut into numerous linear segments. The creamy white or pale primrose flowers about 1–2 in. across appear in May and June.

Culture &c. as above. This pretty species, although perhaps not so ornamental as many of the other Windflowers, is valuable for planting in shady places.

A. Fannini. — A very beautiful and remarkable Windflower, native of Natal, where it grows at an elevation of 3,000–4,000 ft. In a wild state it attains a height of about 5 feet, and the roundish, angled, Rhubarb-like leaves a width of 2 ft. or more. In a cultivated state, however, it grows only about 2 ft. high, and the leaves rarely measure more than a foot in diameter. The beautiful sweet-scented star-like flowers are quite as large as in wild specimens. They appear in April and May and are 2–3 in. across, the oblong acute segments being at first greenish-yellow, but afterwards a pure snowy white within, surrounding a mass of yellow stamens in the centre.

Culture and Propagation. — This species seems to be perfectly hardy at least as far north as Kew, when grown in rich and well-manured loamy soil in warm positions facing south. It is best left undisturbed for several years so that it may become thoroughly established. The leaves die down every winter and during that period the plants may be mulched with a layer of rich manure, and in the event of severe weather some litter or dry leaves may be placed over the crowns. The plants may be increased by carefully dividing the roots in spring or by sowing imported seeds under glass, afterwards pricking the young plants out.

A. fulgens (*Scarlet Windflower*).—This is a native of S. Europe, growing about 1 ft. high, with bright green 3-lobed cut and toothed leaves. The large solitary flowers which appear in May are 2 in. or more across, and of a brilliant scarlet-crimson colour, sometimes with a paler zone at the base around the jet black bunch of stamens in the centre.

Culture and Propagation. — This plant does best in rich loamy soil with a dash of lime in it, and is suitable for the partially shaded spots in the rockery or flower border. Stagnant moisture at the roots is fatal to it, hence the necessity for good drainage. The roots may be planted almost at any time, but during early autumn is the best time. Increased by dividing the roots, or from seeds. *A. fulgens major* is a fine form, and *A. Pavonina* (the Peacock Anemone) is a double form.

A. Halleri (*Pulsatilla Halleri*). — A Swiss plant about 6 in. high, with pinnate hairy leaves, cut into lance-shaped pointed divisions. Flowers in May, the 6 oval lance-shaped sepals being of a purple or deep lilac colour, and in strong contrast to the conspicuous bunch of yellow stamens in the centre. *A. Hackeli* seems to be a form of this species, but differs in having more woolly stems, less finely cut leaves, and larger blossoms.

Culture &c. as above. This is a suitable plant for sunny positions in the rockery or the edges of flower borders. May be increased by seeds or division.

A. Hepatica (*Hepatica triloba*).—This is the common Hepatica of S. Europe. It grows 4–6 in. high, with heart-shaped leaves, having 3 entire ovate pointed lobes. The blue flowers, with 6–9 sepals, usually appear about February, and are very attractive.

Among the many varieties of this species may be mentioned *alba* with pure white flowers; *cærulea*, single and double forms of which exist, with blue flowers; *rubra* (double and single) with reddish-pink flowers; *lilacina*, a pretty mauve kind; *splendens*, a single red; and *Barlowi*, a richly coloured sky-blue sport from the single blue, besides others.

Culture &c. as above. Hepaticas are charming spring flowers. They are of a deep-rooting nature, and prefer a rich porous soil in sheltered places. When left undisturbed for a few years they form fine clumps and often produce seedlings in favourable spots.

A. japonica (*Japanese Anemone*).—A fine autumn-flowering Japanese species about 2–3 ft. high with ternate unequally lobed and toothed leaves. The rosy-carmine flowers, which are borne on long stalks, are over 2 in. across, and have numerous conspicuous golden stamens in the centre, last a long time in perfection and make the garden gay from August up to the approach of frost.

The variety *alba*—also known as *Honorine Jobert*—is a splendid variety, with masses of pure white flowers each about 3 in. across.

The variety *elegans* (also called *rosea* and *hybrida*) is a variety with a more tufted habit, broader leaves, and pale rose flowers.

Culture and Propagation. — The Japanese Anemone and its varieties thrive in deep rich soil, and if allowed to remain undisturbed for several years produce a grand effect either in groups by themselves, or in the borders with other plants. They may be increased by division, or from root cuttings placed in a hotbed. It is very rarely indeed that *A. japonica* ripens seed in cultivation, but it has done so on one or two occasions. The seeds were sown with the result that varieties called *Lord Ardilaun* and *Lady Ardilaun* were raised. The latter is very fastidious and almost refuses to grow at all in some gardens, especially if the soil has been heavily dressed with rich manure. It has, however, been found to flourish in deep and well-dug loamy soil, with the addition of a little leaf mould at the time of planting. It grows about 4 ft. high, and may be recognised by its Vine-like foliage and white flowers flushed outside with violet-purple. When well grown it produces seeds freely. *Lord Ardilaun* is usually better, but neither variety is at present equal in beauty and vigour to the parent. Another variety named *Whirlwind* has been introduced from America, and a nearly double-flowered variety has been raised in France under the name of *Coupe d'Argent*.

A. lancifolia.—A very rare tuberous-rooted species from Pennsylvania growing only about 3 in. high. The stalked ternate leaves are cut into lance-shaped roundly toothed segments, and the white solitary flowers with 5 ovate-acute sepals appear in May. A plant for the rockery.

Culture &c. as above.

A. multifida (*A. hudsoniana*). — This N. American species grows 6–12 in. high and has ternate leaves, the wedge-shaped segments of which are much cut into linear lobes. The small red, whitish-yellow or citron-coloured flowers appear in June, having 5–10 elliptic-obtuse sepals.

Culture &c. as above. Suitable for rockery or border. Increased by division or seed.

A. narcissiflora (*Narcissus-flowered Anemone*). — This very variable and beautiful species, native of Europe and N. America, grows about 12 in. high. The somewhat hairy radical leaves are 3–5-parted with deeply toothed lobes. The many-flowered umbels of white or purplish blossoms appear in May, and have 5–6 ovate, blunt or acute sepals.

Culture &c. as above. This species prefers a somewhat calcareous or sandy soil in borders or rockeries, and may be increased by division.

A. nemorosa (*Wood Anemone*).—This charming native species adorns the woods and copses all over the country as well as in Europe and N. America. It has a horizontal woody rootstock and reaches a height of 4–8 in. The stalked leaves, which are covered with silky hairs when young, are divided two or three times into long narrow segments. The white (rarely purple) solitary flowers with 6 oval veined sepals are 1–2 in. across, and appear in April and May. The variety *robinsoniana*, which is probably identical with *cærulea*, has sky-blue flowers and is very beautiful. A new form of this called *Alleni* is a more vigorous grower and has larger and more highly tinted blossoms. The double variety (*flore pleno*) is a pretty plant with white blossoms which last longer than those of the type. It is best grown in clumps in rich loamy soil.

There is also a single and double variety *rosea*, with rose-coloured flowers, and a double form called *bracteata flore pleno* having white flowers surrounded by a large involucre.

Culture &c. as above. Although the Wood Anemone is far more effective in its native state, it is a lovely plant for the rockery or flower border in somewhat shaded situations.

A. obtusiloba.—A Himalayan species with very hairy 3-lobed heart-shaped leaves cut into broadly wedge-shaped, deeply crenated segments. The flowers have 5 cream-coloured obovate sepals, and appear in June.

Culture &c. as above. A warm and sheltered position is required for this plant.

A. palmata.—This is a distinct tuberous-rooted plant about 6–8 in. high, from the Mediterranean region. The roundish heart-shaped leathery leaves are bluntly 3–5-lobed, slightly toothed and hairy. The large, glossy, golden-yellow flowers with 10–12 oblong obtuse sepals appear in May and June, opening in the sun. The double variety, *flore pleno*, and the white one, *alba*, are both pretty but very scarce.

Culture and Propagation.—*A. palmata* grows best in flat and dampish places in deep turfy peat, or loam and leaf soil, into which it roots deeply and forms strong clumps. It is increased by dividing the rootstocks or from seeds.

A. patens.—A species of N. Europe, with pinnate 3-parted toothed leaves, which appear after the flowers. In June the purplish or rarely yellow flowers with 5–6 sepals appear, being almost directly seated on the involucre. The variety *nuttalliana* is a pretty border plant about 1 ft. high from N. America. The flowers are purple and cream-coloured with connivent sepals hairy on the outside.

Culture &c. as above.

A. polyanthes.—A Himalayan species 12–18 in. high, with round 5–7-lobed and toothed leaves 2–4 in. across, borne on stout stalks 4–10 in. long. The white flowers 1½–2 in. across appear in May and June and are borne on branched umbels at the top of a stout stalk, the base of the umbel having a leafy involucre of broadly wedge-shaped lobed and toothed bracts or stalkless leaves.

Culture &c. as above. This plant is not yet well known and is rather tender. It requires to be grown in warm sheltered spots and may be increased by careful division in spring as growth is about to commence.

A. pratensis (*Pulsatilla pratensis*).—This N. European species is closely related to the Pasque Flower (*A. Pulsatilla*), and differs chiefly in having smaller flowers with narrower and more acute sepals connivent at the base, and reflexed at the tips. It is about 6–12 in. high, with many-parted linear-lobed leaves, and dark purple drooping flowers which appear in May.

Culture &c. as above.

A. Pulsatilla (*Pulsatilla vulgaris*).—The Pasque Flower is a native of our chalky downs and limestone pastures, and also distributed throughout Europe to N. Asia. It grows from 3 to 12 in. high. The leaves, which spring from a stout woody rootstock, and develop after flowering, are thrice pinnatifid, with linear segments, those of the involucre being sessile and cut to the base into long linear portions. The dull purple flowers, each about 1½ in. across, appear in May and June, having 6 erect silky sepals, outer stamens reduced to glands, and fruits with long feathery tails. There are several varieties, among which may be mentioned *dahurica*, very dwarf, with very hairy oblong sepals; *lilacina*, with lilac flowers; and *rubra*, a red-flowered form with blunter sepals.

Culture and Propagation. — The Pasque Flower delights in deep, light and well-drained soil, forming strong clumps, and flowering freely, either in rockeries or the edges of borders. Increased by seeds or division.

A. ranunculoides (*Yellow Wood Anemone*).—A tuberous-rooted species of S. Europe, growing 4–6 in. high, with 3–5-parted leaves having deeply toothed somewhat trifid segments. The clear golden-yellow flowers, with 5 or 6 elliptic sepals, appear in March either singly or in pairs. There is a Pyrenean variety with purple flowers, and one named *pallida* with sulphur-coloured ones.

Culture &c. as above. This charming little plant is occasionally found naturalised in English woods, and likes the same treatment as the Pasque Flower. It looks best grown in broad patches in light and rather sandy soil.

A. rivularis.—A very distinct plant from N. India. It grows about 2 ft. high, and has 3-parted hairy leaves, with cut and toothed wedge-shaped lobes. Large loose umbels of white flowers, with 5 oval sepals, and purple anthers, are borne in April.

Culture &c. as above. The shaded banks of streams or ponds, or damp situations in the flower border, suit this species best.

A. sibirica.—The typical form of this Siberian rock plant is very rarely seen. It is 6 in. high, with ternate leaves, and segments deeply toothed and ciliated. The white flowers, with 6 rounded sepals, appear in June.

Culture &c. as above.

A. stellata (*Star Windflower*).—This is identical with *A. hortensis* and *A. pavonina*. It is tuberous-rooted, and native of S. Europe, growing about 8 or 10 in. high. Leaves 3-parted, with deeply toothed, wedge-shaped lobes. The star-shaped flowers with 10–12 oblong bluntish sepals appear in April, and are red, purple, rose or whitish in colour. Double-flowered varieties are sometimes met with.

Culture &c. as above. This plant likes a warm and sheltered position in well-drained soil, and may be increased by seeds or division.

A. sylvestris (*Snowdrop Windflower*). This handsome species is 6–18 in. high and a native of Central Europe. It has creeping roots, from which arise ternate or quinate leaves, hairy beneath and with segments deeply toothed at the top, those of the involucre being stalked. The slightly drooping, pure white, solitary flowers, which in bud suggest Snowdrops, appear in April. When fully open they are 2–3 in. across, fragrant and with 6 elliptic sepals, and remind one very much of those of the white-flowered *A. japonica*.

The variety *major* has larger and better flowers than the ordinary form, and *flore pleno* is a new double form worth growing. *Baicalense* is a larger flowering variety, dwarfer in growth than the type, with flowers purple on the outside.

Culture and Propagation. — A light soil, rich in humus, and a shaded, moist situation are best for the Snowdrop Anemone. Increased by dividing the roots as recommended above.

A. trifolia.—This is a native of the woody hillsides of Piedmont, the Tyrol, and Siberia, and is closely related to the Wood Anemone (*A. nemorosa*). It is 4–6 in. high, with a creeping habit and ternate leaves divided into ovate-lanceolate acute and toothed segments. The white flowers with 5 blunt elliptic sepals appear in April. There is a rose-coloured variety from Austria.

Culture &c. as above.

A. vernalis (*Pulsatilla vernalis*).—This is known as the Shaggy Anemone and grows about 2–3 in. high, the whole plant being covered with long tawny hairs. The pinnate leaves are cut into wedge-shaped lanceolate segments, while the erect bell-shaped flowers which appear in April are solitary and terminal with 5–6 oval sepals, whitish inside, violet and clothed with silky down outside.

Culture &c. as above. It is a native of the Alps and Pyrenees and should be grown in moist and well-drained sandy soil or peat. Increased by dividing the roots or by seed.

A. virginiana.—A N. American species 1–2 ft. high with ternate leaves cut into trifid, pointed and deeply toothed segments. About May the purplish-green or pale purple flowers appear, having 5 elliptic sepals, with a silky down on the outside.

Culture &c. as above. This species requires a damp situation and may be increased by division or seeds.

A. vitifolia (*Vine-leaved Anemone*).—A Himalayan species about 1–2 ft. high, related to the white Japanese Anemone. Leaves heart-shaped, 3–5-lobed, with pointed deeply toothed segments, the under surface and stems being covered with a white wool. The white flowers appear in July, and are 2 in. or more across, with eight oval-oblong sepals, thickly covered with down on the outside.

Culture and Propagation. — This plant does not thrive in all places, but where it does it is worthy of being naturalised. It requires a warm sheltered position and peaty soil.

ADONIS (PHEASANT'S EYE). — This genus includes a few species of handsome annual or perennial herbaceous plants characterised by alternate leaves divided into numerous narrow segments, and solitary terminal flowers with 5–8 coloured deciduous sepals, 5–16 conspicuous petals often spotted at the base, and numerous carpels.

Culture and Propagation.—All the plants grow freely in ordinary garden soil, but prefer a rich, light sandy loam. They are excellent border and rockery plants, but to be seen at their best should be planted in good patches. They flower very freely for the most part, and, if anything, prefer slightly shaded situations to those fully exposed to the scorching rays of the sun. The annual kinds are very useful, and although occasionally a little weedy in habit they may be kept in bounds by a few short sticks and string.

The annual species must of course be raised from seed sown in the spring or autumn each year, either in the open border or in cold frames; the perennials may also be raised from seed in the same way, or by division of the roots in autumn or early spring.

A. æstivalis (*Pheasant's Eye*).—A S. European annual about 1 ft. high, with an almost simple lengthened stem. The deep crimson flowers having flat oblong obtuse petals appear in June.

Culture &c. as above.

A. amurensis.—This species is of recent introduction from N. China, and is somewhat like *A. vernalis*, but has denser foliage. The flowers are bright shining yellow, about 1½ in. across, and usually appear in January and February before any of the other species.

Culture &c. as above.

A. autumnalis (*Red Morocco*).—A native annual about 1 ft. high, with much-branched, very leafy stems and deep green leaves, very much divided into linear segments. From May to September the terminal solitary globose flowers appear, the sepals being greenish, and the broad concave petals scarlet, with a dark spot at the base.

This is an excellent border or rock plant. The fleshy flower stems, when cut, will last a long time in water or moist earth or moss, and the flowers will retain their beauty and freshness.

Culture &c. as above.

A. distorta (*A. apennina*).—This pretty perennial is a native of the Alps and is intermediate between *A. pyrenaica* and *A. vernalis*. It grows 9–12 in. high, and produces its large bright yellow flowers just as those of *A. vernalis* are nearly finished.

Culture &c. as above. It is an excellent plant for massing in moist and partially shaded places in the rockery.

A. pyrenaica (*Pyrenean Pheasant's Eye*).—A Pyrenean perennial, with much-branched stems about 1 ft. high. The lower leaves are on long stalks with trifid petioles and many-parted segments, the upper ones stalkless, much cut, with linear entire divisions. The yellow flowers with 8–10 obtuse petals are almost sessile, and appear about July.

Culture &c. as above. It is difficult to establish in some gardens, and when first planted should be guarded from slugs. Once well established it is safer not to disturb this species. The soil may be replenished annually with a good mulching of well-rotted manure or leaf mould.

A. vernalis (*Ox-Eye*).—A beautiful European perennial about 1–2 ft. high with green feathery Fennel-like foliage. From March to May the bright yellow Anemone-like flowers, each with 10–12 oblong somewhat incurved petals, are borne at the tips of the branches. The sepals are purplish-green and about half as long as the petals, and the flowers are often 3–3½ in. across when fully open.

The variety *sibirica* has somewhat larger flowers than the type.

Culture and Propagation.—This is a graceful plant for the rockery and should be left alone for years in a rich moist sandy loam. It should be in a position more or less sheltered from rough winds, otherwise it is apt to become somewhat dishevelled in appearance.

It is often best raised from seeds sown as soon as ripe in sheltered spots in the border. The seeds, as a rule, do not sprout until the following spring. When large enough to be easily handled, they may be pricked out into a patch of rich soil, and in autumn—about the end of September—they will be fit for transplanting to their permanent quarters in the rockery or flower border. Plants from seeds, however, do not usually flower well until about three or four years old. Where large clumps are established therefore, and require removal, they may be divided to secure bloom more quickly.

A. volgensis. — A Russian species about, 1 ft. high, intermediate between *A. pyrenaica* and *A. vernalis*. The stems are much branched, with scale-like leaves at the base, and in early summer produce large pure yellow flowers, the sepals of which are smooth outside instead of pubescent as in the other species.

Culture &c. as above.

RANUNCULUS (BUTTERCUP; CROWFOOT). — A genus with about 160 species of annual or perennial herbs having entire or much-cut leaves, and white, yellow, or red flowers, either terminal, solitary, or in panicles. Sepals 3-5 caducous. Petals conspicuous or rarely minute, equal in number to the sepals—or as many as 15—with a nectar-bearing scale at the base; stamens and carpels numerous, free and distinct.

R. aconitifolius (*White Bachelor's Buttons; Fair Maids of France; Fair Maids of Kent*).—A beautiful plant 24 in. high, native of Europe. Leaves palmately 3-5-lobed and deeply toothed, those of the stem cut into narrow lance-shaped lobes. The white flowers with oblong, wedge-shaped or rounded petals appear in May and June, sometimes few, sometimes many.

The double variety—*flore pleno*—popularly known as the 'Fair Maids of France' has pure snow-white flowers over half an inch across, and as symmetrical in form as a Camellia.

Culture and Propagation. — It is a pretty plant, easily grown in a moist and shaded spot, as under a north wall, where the flowers last longer in perfection than if the plants are grown in strong sunlight. Seeds of the single variety may be sown in the open border in spring, or in early autumn, or in pots or pans in cold frames. The seedlings may be pricked out and grown on for transplanting in spring or autumn, according to the period of sowing. The plants may also be increased by dividing the roots in spring, or about the end of September or October, and this is the better and probably the only way to increase the double variety, which is a much finer and more decorative garden plant than the single-flowered type.

R. acris flore pleno (*Double Buttercup; Gold Knots; Bachelor's Buttons*).—The type of this plant is the common Buttercup of our pastures and meadows, and is too well known to need any description here. And besides, it is unsuitable for the flower garden. The double variety, however, is a pretty border plant, and very ornamental when in a good sunny position in moist soil. The bright yellow flowers are borne in button-like rosettes from April to September.

Culture &c. as above. The double-flowered Buttercup can only be increased by dividing the roots in spring or autumn.

R. alpestris.—A native of the Alpine chalky regions of Central Europe, growing 3-6 in. high. Leaves roundish heart-shaped, dark glossy green, 3-lobed, with the lobes deeply crenate and blunt at the apex; the leaves of the stem lance-shaped entire or occasionally more or less trifid. From April to August 1-3 white flowers each about an inch across are borne on a stem, the 5 petals being obcordate or 3-lobed, and surrounding a conspicuous cluster of yellow stamens in the centre.

Culture &c. as above. This species grows well in moist, sandy soil, and is suitable for rockeries when grown in bold patches.

R. amplexicaulis (*Snowy Crowfoot*). A beautiful species 3-12 in. high, native of the Pyrenees and Western Alps. It is easily recognised by its undivided ovate or lance-shaped tapering leaves, which clasp the stem at the base, and are smooth, glaucous, or with a few deciduous hairs on the edges. The snow-white flowers with yellow centres appear in April and May, 1-6 being on each stem. Occasionally the flowers are double.

Culture &c. as above. Grows well in deep moist loam, and may be naturalised among dwarf-growing plants in rather shaded situations.

R. anemonoides (*Anemone Crowfoot*). A pretty little plant from the Styrian Alps and Southern Tyrol. It is 3-6 in. high with glaucous green biternately divided leaves cut into linear segments. The rather large flowers, with numerous divisions in the petals, are greenish-white inside, pink on the outside, and appear during the summer months.

Culture &c. as above. It likes a mcist well-drained soil and a cool situation. In some localities it is rather delicate, but once established in the clefts of the rockery it makes a pretty picture.

R. aquatilis (*Lodewort; Ram's Foot*). A variable British Buttercup, found floating in shallow streams and pools of fresh water. The submerged leaves are much divided into slender linear lobes, while those floating on the surface of the water are usually 3-lobed, or absent. The beautiful pure white flowers, about ¾ in. across, are borne in great profusion during the summer months, and look like miniature single white Water Lilies on the bosom of the waters.

Culture and Propagation. — Seeds may be sown in pots standing up to the rims in water, or the roots may be divided in autumn after flowering is over.

R. asiaticus.—This native of S. Europe and Asia has given rise to all the garden Ranunculuses. It grows about 9 in. high, with erect stems, simple or branched at the base. The leaves are ternate or biternate with toothed or deeply trifid segments. The flowers, which appear in summer, vary a good deal in colour, and are nearly always double in the cultivated forms, having very large obovate and very obtuse petals.

There are many varieties of the Garden Ranunculus under fancy names, but the following varieties or sections deserve special mention:—

R. a. sanguineus (*Turkey Ranunculus*).—This variety has simple stems and ternate leaves with toothed obtuse segments and double flowers of various colours such as orange, yellow, purple, or variegations of the same, excluding distinctly white or blue colours.

R. a. superbus is a pretty strain with large single, semi-double and double flowers of brilliant colours.

R. a. tenuilobus.—This variety has a stem more or less branched and much-cut leaves with sharp linear lobes, the flowers being white or yellow, rarely purple.

R. a. vulgaris (*Persian Ranunculus*). This ornamental variety has innumerable seedling forms in cultivation. It has a stem branched at the base; leaves ternate with sharp-pointed trifid segments, and double and single flowers of almost every shade but blue.

The above represent the main divisions into which the Asiatic Ranunculus naturally falls. But owing to the careful selection, hybridisation, and intercrossing by British and Continental gardeners, extending over many generations, the wild forms have practically disappeared, and there are now an infinite number of varieties cultivated, being divided into groups, known as Scotch, Dutch, French, Italian, Persian, and Turban or Turkish. The Scotch and Dutch varieties are usually the finest forms of the Persian, and are dwarfer with double flowers edged and spotted. The French and Italian varieties are modifications of the Turkish, and are remarkable for their vigour and size. The Turkish forms are less variegated in colour than the others and have a large proportion of scarlet, white, yellow and orange self-coloured flowers, somewhat resembling Pæonies.

As the names in tradesmen's catalogues represent mere variations, it is unnecessary to give them here, as they would probably be obsolete in a very short time. It would therefore be better to make an up-to-date selection from the catalogues themselves.

Culture and Propagation.—The best time to plant the garden Ranunculus is about the end of February, although the work may also be done in October in favourable weather. The plants like an open situation but not too much exposed to summer sun, and the soil should consist of loam well mixed with decayed manure, rotten leaves &c., so that it may always be kept in a fairly humid state. The claws of the roots should be placed downwards, drills about 6 in. apart and 2 in. deep having previously been made with a hoe. The soil should be raked over the roots and made firm by patting with a spade. When the leaves appear, a little artificial manure or mulch of rotten dung may be given, the latter being preferable in dry seasons. As the roots deteriorate somewhat by lying dormant in the damp soil, especially in extra wet seasons, they should be taken up as soon as the leaves and flowers have withered, and stored in a cool airy place until the time for planting comes round again.

Seeds are obtainable as a rule only from the semi-double varieties. When the flower heads have withered, they should be cut off and placed in a paper bag, and hung up to dry and thoroughly ripen before being cleansed. The seeds may be sown in August and September in cold frames and in light rich sandy soil. The young plants should be protected from frost during the winter months, but should have as much light and air as possible on all favourable occasions. About the end of April or May they will be fit for transplanting to the open ground. Seeds may also be sown out of doors about April and May, but if the seedlings are left in the soil for the winter, they should be protected by lights. Seedling plants commence to bloom well about the third or fourth year.

From the old roots there are often offsets. These may be placed by themselves and sown like seeds the following spring.

R. bulbosus flore pleno (*Double-flowered British Buttercup*).—This is a very pretty form of the common bulbous Buttercup of meadows and pastures. It grows about 12 in. high and produces numerous double yellow flowers during the summer. It is suitable for borders.

Sometimes the flowers are singularly prolific. From the centre of one arises another, and from this second one sometimes a third.

Culture &c. the same as for *R. acris flore pleno*.

R. bullatus.—An interesting species from N. Africa and Corsica, having tufts of oval toothed and more or less wrinkled leaves arising from a knotty rootstock. The fragrant yellow flowers appear late in the year and are therefore liable to injury from frost.

Culture and Propagation. — This species is too tender for the outdoor flower garden except in the warmest parts of the south and west. It may, however, be flowered in cold frames or greenhouses for the winter. New plants are obtained by dividing the rootstocks after the leaves and flowers have withered.

R. cardiophyllus (*Heart-leaved Buttercup*).—This hairy or pubescent plant is a native of N. America, and grows about 12 in. high. The root-leaves are roundish heart-shaped, crenate and much cut, the stem-leaves being palmately cut with linear deeply crenate lobes. The large golden flowers appear in May.

Culture &c. the same as for *R. aconitifolius*.

R. carpaticus. — A handsome Hungarian perennial about 1 ft. high, having creeping rootstocks and roundish palmately lobed leaves with crenate margins. The bright golden-yellow flowers, which appear in May and June, are about 2 in. across, and are very attractive when in masses.

Culture &c. as for *R. alpestris.*

R. cassubicus.—A species 6 in. high, native of Northern and Eastern Europe. The lower leaves are stalked, smooth, kidney-shaped and crenate, those of the stem being divided into linear toothed lobes. Flowers in June and July.

Culture &c. the same as for *R. aconitifolius.*

R. chærophyllus (*Chervil-leaved Buttercup*). — A hardy tuberous-rooted species from Portugal, 8–12 in. high. Leaves stalked, much-divided segments, very narrow stems slightly downy. Flowers bright glistening yellow, over an inch across, with persistent non-reflexed sepals.

Culture &c. the same as for *R. aconitifolius.*

R. cortusæfolius.—This fine species is a native of Teneriffe and reaches a height of 3–5 ft. in the very mildest parts of this country. The leaves are very large, and like the branching stems more or less hairy; the lower ones are heart or kidney-shaped, lobed with coarsely crenate edges, the upper ones being almost stalkless, 3–5-parted, those near the flowers lance-shaped. The large glistening yellow flowers are 2 in. or more across, and are borne in erect corymbs in early summer.

Culture &c. the same as for *R. Lyalli* below. Except in the very mildest parts, it would be safer to treat this plant as tender, and give protection in winter by covering the rootstock with coco-nut fibre, ashes &c.

R. crenatus.—A charming Hungarian species about 6 in. high, with pure white flowers which appear in June and July, and rather remind one of those of *R. alpestris.* The petals, however, have crenate edges, and the flowers are only produced singly on the stems.

Culture &c. as above for *R. alpestris.*

R. creticus macrophyllus.—A native of the Greek Archipelago with branched slightly hairy stems and leaves, the latter being very deeply cut with slightly rounded teeth. The golden-yellow flowers appear in May, and the plant reaches a height of about 1 ft.

Culture &c. the same as for *R. Lyalli.*

R. Ficaria (*Figwort; Lesser Celandine; Pilewort*). — This British plant would be very beautiful in gardens if it were not such a rank weed. Once established it is difficult to eradicate, and hoeing only serves to propagate it by dividing the small club-like roots. Hand-picking is the surest way of ridding beds and borders of it. It is easily recognised by its heart-shaped bluntly angled or crenate shiny green smooth leaves, radiating on the ground from a short stem, and flowering from early March till May.

R. glacialis (*Glacier Buttercup*). — This plant is found high up on the Alps and Pyrenees near the snow line. It is 3–6 in. high, with leaves usually smooth, the upper ones sometimes hairy, palmately 3-parted or ternate with lobes deeply cut. The flowers appear in summer, one to five on a stem, and are white, tinged with purplish-rose outside.

Culture and Propagation. — Deep, gritty, peaty soil and a cool, damp spot in the rockery suit this plant best. *R. gelidus* and *R. roseus* are forms requiring the same treatment.

R. Gouani. — A vigorous-growing Pyrenean Buttercup about 18 in. high, with slightly downy 3–5-parted leaves, and bright yellow flowers, about 2 in. across, produced in May and June.

Culture &c. the same as for *R. aconitifolius.*

R. gramineus (*Grass-leaved Buttercup*).—A native of S.W. Europe, 6–12 in. high, with lance-shaped linear uncut leaves, arising from fascicled roots, and yellow flowers borne one to three on a stem in May and June. The variety *flore pleno* has double flowers.

Culture &c. This is the same as for the varieties of *R. asiaticus. R. gramineus* likes a sandy calcareous soil in moist and semi-shady spots. When grown in large masses it looks very effective in the rockery.

R. Lingua (*Greater Spearwort*).—This is a native of our marshes and ditches, about 3 ft. high, and is suitable for the margins of lakes, streams, bogs &c. The leaves are stalkless, lance-shaped, entire or toothed, 6–10 in. long, with parallel and reticulated veins. The handsome flowers about 2 in. across are borne in panicles from July to September, and are bright yellow in colour.

Culture &c. the same as for *R. aconitifolius.* Besides seeds and division, plants may also be raised from the bulbils which often form in the axils of the older leaves.

R. Lyalli (*New Zealand Water Lily; Rockwood Lily*). — A very handsome species 2–4 ft. high, from New Zealand. Leaves peltate, smooth, on long stout stalks, the blade being roundish, concave, thick, and leathery, and sometimes more than 12 in. in diameter. The waxy white flowers appear in spring and are 4 in. across, the petals being broadly wedge-shaped.

Culture and Propagation.—*R. Lyalli* cannot be considered perfectly hardy, except in the mildest parts of the country. It should have a sheltered nook from the north and east winds, and deep peaty soil, and is best left alone where it is already doing well. It can be raised from seeds, provided they can be imported in good condition. They are best sown as soon as ripe, or when received, in light rich soil under glass. When the young plants can be easily handled they may be pricked out so as to give more room for growth. Afterwards, when they require still more space, they may be potted up singly and kept in cold frames until they have become sufficiently strong and well-established to warrant their removal to the open border or rockery. On the whole this is a difficult Buttercup to grow well. It is probably 'coddled' too much.

R. millefoliatus.—A plant about 1 ft. high, with stems almost leafless, erect, hairy, and single-flowered, native of S. Europe. Leaves very much cut up into slender linear segments. The solitary yellow flowers appear from May to July.

Culture &c. the same as for *R. aconitifolius* or *R. amplexicaulis.*

R. monspeliacus.—A handsome plant 12–18 in. high, native of S. Europe. Leaves woolly, the lower ones 3-lobed, the lobes wedge-shaped, trifidly toothed; the upper ones 3-parted with entire linear lobes. Flowers bright glistening yellow, more than an inch across, appearing in April and May.

Culture &c. as for *R. aconitifolius.*

R. montanus (*Mountain Buttercup*). A dwarf plant 3–6 in. high from the alpine pastures of the mountain ranges of Europe. Leaves smooth, the lower ones roundish

3-parted, with 3-fid blunt segments; the upper ones stalkless, 3-5-parted into linear entire lobes. The solitary yellow flowers, somewhat larger than those of *R. acris*, appear from May to July, and are borne on more or less downy stems.

Culture &c. the same as for *R. aconitifolius*. Easily increased by division.

R. parnassiæfolius.—A distinct-looking species from high elevations on the Alps and Pyrenees, 3-6 in. high, with velvety stems of a purplish hue. Leaves entire, woolly on the edges, rather heart-shaped, ovate or roundish, those higher up the stem being ovate lance-shaped. The snowy-white flowers, sometimes tinged with pink, are borne in June and July on hairy stalks.

Culture &c. as for *R. alpestris*.

R. pedatus.—A species about 1 ft. high from E. Europe. Lower leaves stalked 3-parted or pedate, with linear entire or bifid lobes; the upper leaves are stalkless, and more or less linear or cut. The yellow flowers appear in May or June.

Culture &c. as for *R. aconitifolius*.

R. repens flore pleno.—This double-flowered yellow variety is often cultivated, but the single-flowered variety—a native of Britain—is a more or less troublesome weed, and best kept out of the flower garden.

Culture &c. the same as for the double variety of *R. acris*.

R. rutæfolius (*Rue-leaved Buttercup*). This grows near the limits of perpetual snow on the Alps, and is 3-6 in. high. It has distinct foliage, much cut and deeply divided, and yellow flowers with 8-10 oblong petals, usually borne in early summer. There seems to be a white-flowered variety in cultivation.

Culture &c. as above for *R. alpestris*.

R. Seguieri. — A handsome species from the Alps, with deeply cut dark green leaves, and fine white flowers which are produced in May and June.

Culture &c. as for *R. aconitifolius*.

R. spicatus (*Spiked Buttercup*). — A beautiful plant 12-18 in. high, which dies down early in summer and re-appears in September and October. Leaves somewhat hairy, roundish, and 3-lobed. The large bright yellow flowers appear in spring, 1-3 on a stem, the carpels in the centre being elevated in the form of a spike. Native of N. Africa and Sicily.

Culture and Propagation. — This species may be divided after the flowers and foliage have withered. Seeds may also be sown as soon as ripe in the open border in special spots, or in pots or pans in cold frames. The seedlings are pricked out when large enough, and afterwards transferred to the open ground when sturdy enough to look after themselves. In the colder parts of the kingdom a little protection is needed in winter, with a little bracken, or a handlight over the plants.

CALTHA (Marsh Marigold). — A small genus of herbaceous perennials with stout creeping rootstocks, and radical heart-shaped leaves. Flowers few, terminal, white or yellow. Sepals 5 or many more, coloured, deciduous. Petals absent. Carpels many, sessile, becoming many-seeded follicles when ripe.

Culture and Propagation. — The various forms of the Marsh Marigold are easily grown on the margins of lakes, rivers, streams &c., or even in the ordinary flower border in a moist spot. They are most effective in large clumps and may be increased by division of the rootstock. Seeds of the single-flowered varieties may also be sown as soon as ripe in pots or pans of loamy soil stood half their depth in water. As the seeds often do not sprout until the following spring, they should not be thrown away in autumn under the impression that they are useless.

C. alpina. — A distinct and beautiful plant 1-2 ft. high, with a bold vigorous habit, resembling that of our native Marsh Marigold. The leaves are roundish heart-shaped or reniform with crenate edges, while the upper stem leaves are coarsely toothed and nearly always sessile. The rich orange-yellow flowers are larger than those of *C. palustris*, but appear about the same period. From a botanical point of view this plant may be only a variety of *C. palustris*, but it is quite distinct enough for garden purposes.

Culture &c. as above.

C. palustris.—This is a well-known native of our marshes, margins of rivers, ditches &c., with stems 1-2 ft. high and large rounded kidney-shaped leaves toothed on the margins. The brilliant golden-yellow flowers are 1-2 in. across and borne on furrowed stalks from March to June.

There are several forms among which may be mentioned the double-flowered *nana plena* and *monstrosa plena*; and the single-flowered *purpurascens* from S. Europe, with purplish shoots; *biflora*, a twin-flowered form from N. America; *parnassifolia*, a dwarf only 3–4 in. high, also from N. America, with heart-shaped ovate toothed leaves; and *leptosepala* from California with white flowers about 1½ in. across.

Culture &c. as above.

C. **radicans** is a native of Scotland, and somewhat rare. It is probably only a form of *C. palustris*, but is distinguished by its deltoid sharply toothed leaves, and dwarfer habit. The yellow flowers appear in May and June.

Culture &c. as above.

TROLLIUS (GLOBE FLOWER). — A genus of about nine species of perennial erect herbs with alternate leaves palmately lobed or cut, and solitary or few large yellow or lilac flowers. Sepals 5–15 petal-like; petals 5–15, small, narrow, with a very short claw, and blade with a glandular pit at the base. Stamens numerous. Carpels 5 or more, becoming follicles when ripe.

Culture and Propagation.—The Globe Flowers or Globe Buttercups will grow in ordinary garden soil, but to obtain luxuriant growth and freedom of flowering they should be planted in rich damp soil, and may be naturalised near the edges of ponds, streams or marshy places.

The plants may be increased by dividing the rootstock in autumn or spring, the former period preferred, as the disturbed plants can make new roots before the winter sets in fairly. If divided in March, the bitter cold and drying winds of that period do a good deal of harm and weaken the plants.

The Globe Flowers may also be raised from seed sown in pans or boxes in spring and planted out in the autumn, but it takes two or three seasons for the seedlings to become really fine flowering plants.

T. **acaulis** (*Stemless Globe Flower*).—A native of the W. Himalayas, 4–6 in. high, with very dwarf stem and 5-parted leaves. Its bright golden flowers, each about 2 in. across, are borne in July, the 7 sepals being broadly oval obtuse, and the 14 petals narrowly wedge-shaped.

Culture &c. as above. This plant prefers a fine peaty soil in a moist spot.

T. **altaicus** (*Altaian Globe Flower*). A species 12–18 in. high with much-divided leaves, and pale orange or yellow flowers about 2 in. across, having 10, often 15–20 broad obtuse occasionally crenulate sepals.

Culture &c. as above.

T. **asiaticus** (*Asiatic Globe Flower*). A handsome free-flowering species from N. Asia, China, and Japan, 12–18 in. high and closely resembling *T. europæus*. Leaves deeply divided and cut. Flowers deep yellow with 10 spreading sepals, and 10 petals longer than the stamens. There is a good deal of variation in this species owing doubtless to its somewhat wide geographical distribution. *Japonicus* or *Fortunei*, and 'Orange Globe' with rich orange-yellow flowers, may be mentioned as fine varieties; also *albus* which has very pale yellow flowers—not white, as the name would imply; and *major*, with large blossoms.

Culture &c. as above.

T. **caucasicus.** — A pretty Caucasian perennial 9–12 in. high with leaves deeply divided into 5–7 lobes. The large globular orange-yellow flowers appear in May and June.

Culture &c. as above.

T. **europæus** (*Boits; Common Globe Flower; Golden Ball*).—A native species growing in subalpine pastures and copses, having stems 6–24 in. high. The lower stalked leaves are somewhat roundish, 5-parted with wedge-shaped lobes; the upper ones being smaller and without stalks. The flowers are about 2 in. across, pale yellow, with roundish concave sepals, and oblong petals, appearing from June to August. They emit a fragrant odour, and seen at a distance appear to be semi-double, somewhat resembliug forms of *R. asiaticus*.

There are many forms in cultivation, such as *albus*, *superbus*, a fine late one, *aurantiacus*, and *napellifolius*, a somewhat dwarfer and more showy kind, while *giganteus*, as the name implies, has larger flowers than the others.

Culture &c. as above.

T. **laxus** (*T. americanus*).—A native of N. America, 6–9 in. high with palmately cut leaves. Flowers appear in May, pale greenish-yellow or nearly white, about 1½ in. across, with 5 or 6 spreading sepals, and 15–25 small petals much shorter than the stamens.

Culture &c. as above.

T. patulus.—A Siberian species 8–12 n. high with golden-yellow flowers.

Culture &c. as above.

HELLEBORUS (HELLEBORE; CHRISTMAS ROSE, and BEAR'S FOOT).—A genus containing about twelve species of erect perennial herbs, with more or less leathery leaves palmately, pedately or digitately lobed. Flowers solitary or in panicles, white, greenish, yellowish, or purple in colour. Sepals 5, regular, petal-like, persistent. Petals small, tubular, two-lipped. Carpels numerous, separate or cohering at the base, when mature (follicles) opening at the top.

Culture and Propagation.—Hellebores should be grown in deep rich loamy soil, in damp and rather shaded places, such as under trees or at the foot of a north wall. As the flowers appear during the cheerless and often rainy winter months, it is well to have the plants where they can be protected, if necessary, from the damaging effects of mud splashes. The Christmas Rose (*H. niger*), for example, has most beautiful white flowers in winter, if protected with a glass light, or even a piece of canvas, when in bloom.

Hellebores are chiefly increased by dividing the rootstock after flowering. They may also be obtained by the slower process of sowing seeds when new varieties or variations of old ones are desired or expected. The seeds may be sown in rich soil, in pots or pans, in cold frames as soon as ripe. The following spring the seedlings will be fit for pricking out, so that with extra space they will become large and strong enough for transplanting about the end of September. Seeds may also be sown out of doors in specially prepared spots, not exposed to strong sunshine.

H. abschasicus (*Caucasian Christmas Rose*).—An evergreen Caucasian species about 1 ft. high, and leaves about 1 ft. across, divided into 5–7 bluntly lance-shaped widely spreading toothed lobes. Flowers from January to March green or purplish, nodding, about 2 in. across, with oval pointed sepals, yellowish-white stamens and 18–24 petals. The variety *albus* has pure white flowers, which appear from February to May.

Culture &c. as above.

H. atrorubens.—A native of the woods and thickets of S. Europe. It is about 18 in. high, the lower leaves pedate with 5 9 lobes, the upper ones almost sessile and palmate. The deep purple flowers, changing with age to dull purple, appear about March and April, and have roundish sepals about 1 in. long.

Culture &c. as above.

H. caucasicus.—A Caucasian species about 18 in. high, with very glossy oblong leaves 3–4 in. broad. The pale green flowers appear from January to April, and have much-lapped sepals about 1½ in. long. The variety *punctatus* is a garden hybrid with showy reddish-purple flowers spotted inside with dark purple. A newer form called *nigricans* is recognised by its bluish-black flowers.

Culture &c. as above.

H. colchicus. — This is a native of Asia Minor, and is perhaps the best of the red or crimson Hellebores. It is about 18 in. high, with very large, pedate, toothed, and distinctly veined leaves, divided 5–7 times. From three to six bright deep purple flowers, with yellow stamens, are produced well above the foliage from January to the end of March. The flat sepals are sometimes rounded in shape, and overlap each other.

H. colchicus has been crossed with *H. guttatus* and other species, the results being decided acquisitions to the garden. One variety—*coccineus*—has large handsome drooping bell-shaped blossoms of a beautiful plum purple suffused with red.

Culture &c. as above.

H. fœtidus (*Stinking Hellebore; Setter Wort; Bear's Foot*). — A very distinct and ornamental evergreen native species, growing in chalky pastures and thickets, forming luxuriant tufts 2–3 ft. high. The lower leaves are stalked, divided 5–7 times into linear, toothed segments. The green flowers, 1 in. across, tipped with purple, are borne on drooping panicled cymes in February and March.

Culture &c. as above.

H. lividus (*H. corsicus*).—A native of Corsica, about 18 in. high, with smooth trifid leaves, the segments being oblong, lance-shaped and sharply toothed; from

10 to 20 pale green flowers with nearly flat and spreading sepals appear in March in a deltoid corymb.

Culture &c. as above.

H. niger (*Common Christmas Rose*). This beautiful and well-known plant is a native of Central and Eastern Europe and W. Asia. It grows 6–18 in. high, with smooth leathery pedate leaves cut into 5–10 lance-shaped segments. From 1–3 flowers, each 2–3 in. across when fully expanded, are borne on a stem from Christmas onwards. They vary in colour from pure waxy white to a delicate blush tint.

Among the varieties of this species may be mentioned: *altifolius* or *maximus*, which has large flowers white inside, tinged with rose outside, becoming deeper coloured with age. The leaf-stalks are also mottled with purple; *angustifolius*, of which there are two forms: one, the 'Manchester,' with leaf and flower stalks, pale green and without spots, and numerous flowers pure white throughout; the other, the 'Scotch,' a dwarf compact plant with flowers pure white within, slightly tinged with rose outside; *Madame Fourçade* and *major* are varieties with white flowers, the latter being particularly free flowering.

Culture &c. as above. This species may be slightly forced by simply lifting the clumps and placing them in a cool greenhouse for the flowers to open in all their purity. The blooms are in great demand with florists at Christmas time.

H. odorus (*Sweet-scented Hellebore*). This Hungarian species is about 18 in. high, with pale green leaves veined with white, those of the root stalked, pedate, with 6–8 lance-shaped regularly toothed segments. The green, sweet-scented drooping flowers, each about 2 in. across, appear from February to April. The variety *purpurascens* is dwarfer than the type, and has purplish-red flowers with rounded overlapping sepals curved in at the edges, and white stamens.

Culture &c. as above.

H. olympicus (*Olympian Hellebore*). A handsome species 1–2 ft. high, native of Greece. Leaves digitate, pedate, or palmate, cut into 5–7 linear oblong smooth lobes with toothed margins. The purplish flowers, with roundish sepals, and yellowish stamens, appear from February to April, two or three being on one stem.

Culture &c. as above, This plant requires a somewhat warmer situation than the other species and does well in sheltered and sunny spots in the border or rockery.

H. orientalis (*Lenten Rose; Oriental Hellebore*). — A fine species, native of Greece and Syria, and growing 8-24 in. high. Leaves much divided, and somewhat downy when young, and cut into 7–9 more or less lance-shaped toothed segments. The large rosy flowers with overlapping sepals appear from February to May, two to six blossoms on a stem. Several vigorous hybrids have been raised by crossing this species with the white-flowered *H. niger* and the purple form of *H. odorus*.

Other varieties, often described as species, are *antiquorum*, which differs from the typical *H. orientalis* by its smooth leaves, and white flowers softly suffused with pink and grey; and *guttatus* with 5–7 white flowers on a stem, 2 in. across, dotted with purple; *subpunctatus* is a form of *guttatus*, with white flowers faintly spotted with green inside.

Culture &c. as above. Lenten Hellebores are best seen to advantage when left undisturbed for several years. They thrive in a deep rich and well-drained loam in positions that are fairly well sheltered, either by shrubs or walls, from keen cold winds. Among the numerous forms, to which many fancy names have been given, only those with clear and distinct colours should be selected and grown in large bold masses. The dull dead purple kinds are often too smeary to be attractive. A good mulching of well-rotted manure around the plants every autumn or winter will be of the greatest advantage in imparting fresh food to the soil, and increased vigour to the plants.

H. viridis (*Green Hellebore; Bear's Foot*). — A native of Europe, including Britain, growing about 18 in. high, with smooth, dark green leaves, the lower ones fully developing after flowering and cut into 5–7 narrow toothed segments. The green flowers are 1½–2 in. across and appear in March and April 5 or 6 at a time on the stems furnished with palmately cut leaf-like bracts.

Culture &c. as above.

ERANTHIS (Winter Aconite).—A genus of dwarf and pretty perennials with tuberous roots, palmately cut leaves and solitary yellow flowers. Sepals 5–8, regular, petal-like, deciduous. Petals small, clawed, with a scale at the base. Stamens and carpels numerous, the latter separate, becoming follicles when ripe.

Culture and Propagation. — There are only the species described below. They will grow in almost any soil, and are seen to the best advantage under trees or on banks in semi-wild situations. They are easily increased by division any time after flowering up to the end of September. Seeds may also be sown in the open border, or in pots or pans, but as a rule do not sprout until the following spring. Then they only produce a leaf or two for a few weeks and dry up, leaving only a small tubercle about the size of a pin's head in the soil. Every year this little tubercle becomes larger, and by the end of the third or fourth year is quite full grown and flowers freely.

E. cilicica.—This is a plant with more finely divided leaves and rather duller yellow flowers which appear earlier or later than those of *E. hyemalis* according to locality and circumstance.

Culture &c. as above.

E. hyemalis.—This, the best known species, is a native of W. Europe and grows 3–8 in. high. The yellow sessile flowers appear soon after Christmas or New Year's Day and continue to appear well into March. There are 6–8 oblong sepals and a similar number of very short tubular petals.

Culture &c. as above.

E. sibirica.—A Siberian plant 3 in. or so high. The yellow flowers appear in March and April, having 5 oval sepals.

Culture &c. as above.

COPTIS (Gold Thread).—A genus of pretty evergreen bog plants, with ternately cut leaves and white flowers. Sepals 5–6, regular, petal-like, deciduous. Petals 5–6, small, hooded or linear. Carpels (follicles when ripe) numerous, separate.

Culture and Propagation. — These plants may be easily grown in moist sandy or peaty soil and increased by dividing the roots in autumn or spring. Seeds may also be sown as soon as ripe in pots or pans of sandy peat and placed in cold frames for the winter. The seedlings are pricked out when large enough into other boxes or pots, and may be transferred to the open ground in spring during mild weather. They may be grown as an edging or border to Rhododendrons, Azaleas, Kalmias, and other plants of the Erica family (see p. 574).

C. asplenifolia.—A native of N.W. America and Japan, about 1 ft. high, with biternate leaves, cut into sharply toothed segments. Flowers white with 5 very long and narrow petals, dilated and hooded in the middle, appearing in early summer.

Culture &c. as above.

C. occidentalis.—A plant 6–12 in. high from the Rocky Mountains. Leaves trifoliate, with short-stalked broadly ovate leaflets. The white flowers have 6 non-hooded petals and appear in early summer.

Culture &c. as above.

C. orientalis. — A Japanese species 3–9 in. high. Leaves ternate, each of the divisions pinnate at the base, and pinnatifid above; lobes deeply cut. Flowers white, in early summer.

Culture &c. as above.

C. trifolia (*Gold Thread*).—A native of N. America, Asia, and Europe, 3–5 in. high, with bright yellow fibrous roots, from which the popular name is derived. Leaves trifoliate, with blunt toothed and slightly 3-lobed leaflets. The white flowers appear from April to July on slender stalks which spring from the roots.

Culture &c. as above.

ISOPYRUM. — A genus containing about seven species of dwarf slender perennial herbs, with ternately decompound leaves and white flowers solitary or loosely paniculate; sepals 5–6, regular, petal-like, deciduous. Petals 5, very short and very variable in form, sometimes absent. Carpels (follicles when ripe) 2–20, separate. Stamens sometimes as many as 10 in number.

I. thalictroides.—This European plant is the only species in cultivation and has very gracefully cut foliage somewhat resembling Maidenhair Fern fronds, or some of the Meadow Rues (Thalictrum). It is 9–15 in. high, and produces its small white flowers about April and May.

Culture and Propagation.—This is a beautiful plant for the rockery and grows well in sandy or ordinary garden soil. It may be increased from seeds sown in spring in the open border, or in pots or pans in cold frames, so that the seedlings can be more readily attended to when large enough to handle easily. The roots also may be divided about the end of September, or in spring just as growth is beginning. This species makes a graceful edging plant.

NIGELLA (DEVIL-IN-THE-BUSH; LOVE-IN-A-MIST; FENNEL-FLOWER). — A genus of about 10 species of curious erect annuals, with alternate leaves cut into very narrow more or less finely cut pinnate segments. Flowers white, blue or yellow. Sepals 5, regular, petal-like, deciduous. Petals 5, clawed, with a small bifid blade. Carpels 3-10, more or less connate, and opening at the top when ripe to shed the numerous seeds.

Culture and Propagation.—Nigellas, or Fennel Flowers, will grow in any ordinary garden soil, and may be easily raised from seeds sown in the open border every spring. When the seedlings are large enough to handle easily they should be thinned out to about 6 in. apart. *N. damascena* and *N. hispanica* are the kinds most generally grown, but the other species as described below may also be tried.

They are all more or less ornamental and interesting plants in the rockery or flower border, and may be cut freely for bouquets, and for room decoration.

N. damascena.—A native of S. Europe and Asia Minor, 1-2 ft. high, with finely cut leaves and large white or blue flowers appearing in summer and surrounded by a mossy involucre. *Flore pleno* is a double-flowered variety, and *alba* has white flowers.

Culture &c. as above.

N. hispanica.—A species 1-2 ft. high from Spain and the south of France. Flowers in July and August, large, deep blue, and without any involucre. There is a white- and also a purple-flowered variety of this species.

Culture &c. as above.

N. Nigellastrum (*Garidella Nigellastrum*).—This is the 'Star Nigella' of S. Europe. It has very finely cut leaves, and produces its brown and green flowers about July.

Culture &c. as above.

N. orientalis.—A curious species from Asia Minor. It is about 18 in. high, with pale blue-green foliage cut into long and narrow segments. The yellow flowers spotted with red appear in summer.

Culture &c. as above.

N. sativa.—This plant is supposed by some to be the Fitches mentioned in Isaiah. It is about 18 in. high and a native of S. Europe, N. Africa, and Asia Minor. The rather hairy erect stems are clothed with leaves cut into short linear diverging segments. The bluish flowers, without an involucre, appear in July.

Culture &c. as above.

AQUILEGIA (COLUMBINE).—A genus of erect perennial herbs, with ternately decompound leaves, the segments of which are usually blunt. The flowers are as a rule very beautiful, vary a good deal in colour, being blue, white, yellow, purple, and scarlet, with intermediate shades, and are borne either singly or in panicles. Sepals 5, regular, petal-like, deciduous. Petals 5, concave, produced downwards between the sepals into a tubular horn-like spur, curved at the tips. Stamens numerous, the inner row sometimes reduced to scale-like staminodes. Carpels 5, separate, changing into opening follicles when ripe.

Culture and Propagation. — The Columbines are well-known and beautiful garden plants; most of them can be easily grown in ordinary soil, especially if it consists chiefly of loam with plenty of vegetable matter in it. Some of the more choice alpine kinds, however, require a little care in regard to soil and situation. They thrive best in well-drained, but withal moist, sandy soil, in half shady places with a northern aspect, and are suitable plants for the rockery. A good mulching of manure in autumn or early winter will be highly beneficial to the plants, and keep them in a vigorous condition for several years, and enable them to bring forth immense numbers of blossoms during the early summer months.

Columbines are easily increased either from seeds sown in spring in the open border; in the autumn in boxes or pans, placed in a cold frame; or by dividing the rootstock in autumn. As seeds are produced in great abundance as a rule, and cross-fertilisation is easily effected, the only sure way to secure an increase of a particular variety is by dividing the rootstock. Every shoot, if carefully detached and planted, will grow and make a strong plant the following season. On the other hand, a charming variety in form and colour may be obtained by planting seedlings. Where *A. chrysantha*, *A. sibirica*, and *A. vulgaris* are grown with other species they sooner or later influence the progeny of the latter raised from seed, and ultimately crush the original types out of the garden. If seeds are not required the withering flower stalks may be cut down and very often in favourable seasons a second blossoming will take place in autumn as a consequence.

A. alpina (*Alpine Columbine*). — A beautiful species 9-24 in. high, from the Swiss Alps. The leaves are twice ternate, with segments deeply divided into linear lobes. The large drooping flowers which appear from May to July are 2-3 in. across when fully open, deep blue, or blue and white, with straight spurs somewhat incurved at the tips. Suitable for the rockery.
Culture &c. as above.

A. atropurpurea. — A Siberian plant 2-3 ft. high, with twice ternate leaves, and dark purple or bluish-violet flowers, almost 2 in. across, and two or three in a head with straight spurs. A border plant.
Culture &c. as above.

A. Bertoloni (*A. Reuteri*). — A pretty little alpine about 12 in. high, with small, dark, blue-green leaves. Flowers in June and July, violet-blue, about 1 in. across, with short knobby spurs.
Culture &c. as above.

A. canadensis (*Canadian Columbine*). A very pretty border or rock plant, 12-24 in. high, native of N. America. The leaves have 3-parted bluntish segments. deeply toothed at the apex. The handsome and attractive flowers appear from April to June; they are scarlet, mixed with yellow, and less than 1 in. across, with straight spurs, and styles and stamens protruding. The variety known as *major* is somewhat larger in growth and blossom than the type, and is an improvement upon it.
Culture &c. as above.

A. chrysantha (*Golden Columbine*).— This fine vigorous species is a native of California and grows 3-4 ft. high, having twice ternate leaves. Flowers from May to August, many on a stem; sepals primrose-yellow, 1 in. long, tinted with purple at the tips; petals of a deeper yellow colour with straight slender spurs 1½-2 in. long. The variety *flavescens* (also known as *aurea*) has flowers of a uniform bright canary-yellow, tinged with red, and spurs somewhat incurved at the tips. There is also a dwarf form 12-18 in. high with golden-yellow flowers, and numerous variations may be obtained by raising plants from seed.
Culture &c. as above.

A. cærulea (*A. leptoceras; A. macrantha*).—A lovely species for borders or foot of rockeries. It is a native of the Rocky Mountains, and 9-15 in. high, with large twice ternate leaves. Several flowers are borne on a stem from April to July, each one being 2½-3 in. across when fully open, and are blue and white in colour, sometimes tinted with lilac or claret, rarely pure white; spurs about 2 in. long, very slender, almost straight, and tipped with green. The variety *alba* (sometimes called *grandiflora*) is a rare and beautiful form with large pure white flowers. The variety *hybrida* is a vigorous grower of garden origin and produces numerous blue and white flowers. A double-flowered variety appeared some few years ago and is likely to remain constant.
Culture &c. as above. In some soils *A. cærulea* is apt to die out. Where this occurs it should be raised from seed annually.

A. flabellata. — A pretty Japanese species about 1 ft. high, with a black tuberous rootstock, and stiffish grey-green leaves cut into 3-5 lobes. The white flowers with short greenish spurs appear in early summer in great abundance, and combined with the dwarfness of the tufted plant make a good picture in the border or rockery.
Culture &c. as above. This Columbine may be grown in pots and gently forced in greenhouses in the early part of the year with good results.

A. formosa (*A. arctica; A. californica; A. eximia; A. f. truncata*). — A showy border plant from N. America, 2-4 ft. high with twice ternate leaves. The flowers appear from May to September, many on a stem, and have bright orange-red sepals about 1 in. long, with a green blunt tip and yellow petals; the spurs are ½-¾ in. long, slender, almost straight, distinctly knobby at the tips.

The plant known as *A. californica hybrida* is a beautiful hybrid with yellow sepals and petals, tinted with orange, and long slender orange-red spurs.
Culture &c. as above.

A. fragrans (*Fragrant Columbine*).— A handsome much-branched bushy species, 1½-2 ft. high, native of the Himalayas. The leaves are twice ternate, the upper ones downy and somewhat glandular. Flowers from May to July, few on a stem, white or pale claret-purple, agreeably fragrant, and slightly downy; spurs slender, twice as long as the truncated petals, slightly curved, and knobbed at the tips.

Culture &c. as above. This plant requires a somewhat warm and sheltered position in moist sandy soil.

A. glandulosa (*Glandular Columbine*). A very pretty Siberian plant 8–12 in. high, with twice ternate much-lobed leaves. Flowers from April to June, with large deep blue nearly oval sepals, and fine blue petals tipped with creamy white, the spur being stout and much incurved. The variety *jucunda* is a smaller plant, but very handsome, and is best treated as a biennial. Seeds may be sown every year to keep up a supply.

Culture and Propagation.—It is safer to divide this plant for increase before the leaves die down, as it is apt to perish, especially on cold soils, if divided when at rest. In many places *A. glandulosa* does not flower very freely, either because it is too often disturbed, or the soil is not sufficiently rich and well manured. Once the plants are established, they should receive a good dressing of manure every autumn or winter, and they will flourish for four or five years without being disturbed.

A. glauca.—A Himalayan plant 12–18 in. high, with twice ternate leaves of a blue-green sheen. Three to four fragrant white, claret-tinted flowers on a stem appear in June, having straight or slightly curved spurs about ⅓ in. long.

Culture &c. as above. As this plant is somewhat tender it may not survive hard winters in unfavourable parts, and would therefore require a little protection. It should be given a warm dry spot.

A. longissima.—A native of Texas and Mexico, 3-4 ft. high, and closely related to *A. chrysantha*. The stems and leaves are covered with silky hairs, the under surface of the foliage being bluish-green. The pale yellow or whitish flowers tinged with red appear in summer and have spurs 4 in. or more long.

Culture &c. as above.

A. olympica. — A native of Greece, about 18 in. high, with 2–3 ternate blue-green leaves, and large delicate mauve flowers with white petals and short blunt spurs. They appear about April and May and are very effective owing to the contrast in colour between the sepals and petals.

Culture &c. as above.

A. pyrenaica. — A pretty rock or border plant 9–12 in. high, native of the Pyrenees. Leaves 1–2 ternate, deep green with linear segments. Flowers from April to June, one to three on a stem, bright lilac-blue, with slender spurs nearly straight, about ¾ in. long, and scarcely knobbed at the top.

Culture &c. as above.

A. sibirica (*A. bicolor; A garnieriana; A. speciosa*). — A pretty rockery plant about 12 in. high, native of Siberia, and having 2 ternate leaves. Flowers in June and July, many on smooth stems, bright lilac, with blunt sepals, the limb of the petals sometimes white; spurs stout, much incurved, ½–¾ in. long.

The double-flowered form *flore pleno* is a more ornamental plant. It is similar in habit to the type, but has heads of double flowers, the spurs of which always point downwards instead of upwards. They are blue and white in colour, but sometimes yellowish, and present a very handsome appearance when seen in masses.

Culture &c. as above.

A. Skinneri.—A noble and distinct border species 2–3 ft. high, from the mountains of Guatemala, with leaves twice ternately divided and unequally lobed. The large handsome flowers are borne on slender stalks from June to August, with red or greenish lance-shaped sepals, small golden-yellow petals, and straight spurs about 2 in. long, and of a bright orange-red.

Culture &c. as above. This should be grown in warm sandy loam. Several forms, apparently hybrids between *A. Skinneri* and *A. vulgaris*, have appeared, and seem to possess a more vigorous constitution than the typical *A. Skinneri*. The flowers also vary a good deal in colour, as might be expected, and red, blue and yellow shades are not uncommon. These primary colours will serve to produce a vast number of intermediate shades in due course. Any exceptionally fine variety can only be kept pure by division of the rootstocks as advised above at p. 155.

A. Stuarti.—This is a splendid Columbine, closely related to *A. glandulosa*, and from a botanical point of view can only be regarded as a form of that species. It was raised by Dr. Stuart of Chirnside, N.B., by fertilising *A. vulgaris wittmanniana* with the pollen of *A. glandulosa*. It is, however, a much finer plant than the latter species, and produces its large attractive flowers—each about 4 in. across—in April and May. The sepals are of a deep and brilliant blue, and in striking contrast to the white and blue tubular and shortly spurred petals surrounding a bunch of bright yellow stamens in the centre.

Culture and Propagation.—This beautiful border plant likes a rich and deeply dug soil and is best raised from seeds sown as soon as ripe in the places where the plants are to bloom. Instead of pricking out the seedlings, they may be thinned out to 8 or 12 in. apart, in mild showery weather. The thinnings may be transplanted to other parts of the garden if required. The plants should not be disturbed for 3 or 4 years, but should have a good mulch of well-rotted manure every winter.

A. thalictrifolia.—A downy plant about 2 ft. high, from the Tyrol, having leaves with 3-stalked segments cut into deep oblong lobes. Flowers in June and July, 2–3 on a stem, lilac-blue, with oblong acute sepals ½ in. long, and slender spurs.

Culture &c. as above.

A. transylvanica.—A beautiful and free-flowering Transylvanian species 1–2 ft. high. All its parts are quite smooth, and the lower leaves are twice ternate, with 2–3-lobed segments. The bright rich blue or purplish flowers are 2–3 inches across, and appear in great profusion during May and June, the ovate oblong sepals being distinctly clawed.

Culture &c. as above. It grows very freely and may be increased by dividing the roots in early autumn or spring. Closely related to *A. glandulosa*.

A. viridiflora (*Green-flowered Columbine*).—A somewhat pretty and distinct species from Siberia, 12–18 in. high, with leaves. Flowers sage-green, sweetly scented and very useful for cutting.

Culture &c. as above.

A. vulgaris (*Common Columbine*).—A native of our woods and thickets and very valuable for its many pretty garden forms. It grows 1–3 ft. high, with almost smooth 2–3 ternate blue-green leaves. The drooping flowers are borne in loose corymbs from May to July, and are blue, dull purple, white, or various shades, including red in the garden forms. Spurs hooked and knobby at the tips.

There are very many forms—both single and double-flowered—to which it would be mere waste of time to give distinctive names. Mention, however, may be made of the following: *alba*, with pure white single flowers; *alba flore pleno*, with white double flowers; *cærulea nana fl. pl.*, very dwarf, with deep blue double flowers; *hybrida*, with lilac-purple sepals and white petals; *vervæniana*, with variegated or yellow mottled foliage; and *wittmanniana*, a fine variety with large bright lilac-purple sepals 1–1¼ in. long, white petals, and curved spurs.

Culture &c. as above.

ANEMONOPSIS.—A genus containing only the following species:—

A. macrophylla.—A pretty hardy perennial 2–3 ft. high, native of Japan. It has large smooth and twice ternate leaves with coarsely toothed leaflets, and somewhat resembles an Actæa in appearance. The flowers, which resemble those of *Anemone japonica*, but are rather smaller, appear in June and July in loose raceme-like clusters. Each flower consists of about 9 or more concave sepals, pale lilac inside, purple outside, and 12 or more linear oblong petals with a nectary-bearing hollow at the base.

Culture and Propagation.—This Japanese plant is hardy in most parts of the kingdom but may require a little protection with dry leaves, litter &c. over the crowns in the coldest parts. It flourishes in ordinary good and well-drained garden soil of a somewhat loamy and gritty nature, and may be increased by division of the roots about March. Seeds if obtained may also be sown in cold frames as soon as ripe, or in gentle heat in spring, and the seedlings planted out in May.

DELPHINIUM (LARKSPUR).—A genus of about 40 species of erect annual or perennial herbs, with alternate lobed or cut leaves. Flowers in racemes or panicles, blue, purple, pink, or white, rarely yellow. Sepals 5, petal-like, separate, or cohering below, the upper one drawn out into a spur behind. Petals 2–4, small, the 2 upper having spurs within the sepaline spur, the two others spurless or absent. Stamens numerous. Carpels (follicles when ripe) 1–5.

Culture and Propagation.—Perennial Larkspurs will grow in almost any soil or situation, but are most luxuriant when given a deep mellow loam well enriched with rotted manure, and fairly moist. As the Larkspurs vary a good deal in height—from 2 to 6 or 8 ft.—they are suitable for planting in various situations. If in beds by themselves, a distance of 2–3 ft. should be between the plants, and greater distance still when in borders with other perennials.

About every third or fourth year the rootstocks may be divided and replanted. This is best done in spring, just when the plants have started into growth. Autumn division is not advisable, as the roots are apt to perish during hard winters, probably because the new ones have not had sufficient time to obtain a good hold of the soil.

As with many other flowers, so Delphinium can be made to bloom a long time by picking off the flowers or spikes as soon as they begin to fade. The side shoots are thus stimulated into growth, and give a fresh supply of flowers. It must, however, be borne in mind that this continual development of flowers has an exhausting effect on the plant's constitution, and this should be counterbalanced by heavy dressings of manure in either a solid or liquid state.

Besides the process of dividing the roots already mentioned, Larkspurs may also be increased by seeds or cuttings. Seeds of the perennial kinds are often very slow in germinating. Those of the annual species may be sown out of doors on a warm border in April, or better still in pans or boxes, from which the seedlings can in due course be pricked off into light rich soil. In early autumn the seeds may also be sown in cold frames, and the seedlings planted out in mild weather the following spring.

Cuttings of the perennial kinds are made of the tops of the young shoots in either spring or autumn. They should be inserted in somewhat sandy soil either singly in small pots, or several in a shallow box, and placed in a cold frame, excluding the air for a few days. When well rooted the young plants may be transferred to their permanent positions.

Besides the natural species described below, there are very many beautiful florists' varieties having single, double, and semi-double flowers in all shades of blue, lilac, lavender, purple and violet. As nurserymen are continually adding new varieties, a reference to their catalogues may be better than giving a list here, which would probably soon be out of date. The following are the most distinct natural Larkspurs:—

D. Ajacis (*Rocket Larkspur*). — A native annual of British cornfields, 12–18 in. high, with fine deeply cut leaves, and blue, white or pink flowers about 1 in. across, produced in long racemes in June and July.

D. Ajacis has given rise to very many varieties of annual Larkspurs, which vary a good deal in habit, and have a very extensive range of colouring among the single and double flowers. *D. Ajacis majus*, *D. A. minus*, *D. A. hyacinthiflorum*, and *D. A. ranunculiflorum* may be taken as types of the various sections cultivated.

Culture &c. as above. Seeds sown annually.

D. armeniacum.—Closely related is a newer species native of Armenia. It has the habit and general appearance of *D. Ajacis*, but is more vigorous in growth, and has soft, sky-blue flowers.

Culture &c. as above. Seeds sown annually.

D. azureum. — A perennial species from N.W. America, about 3 ft. high, with 3–5-parted, many-cleft leaves with linear lobes. The large beautiful sky-blue flowers are borne on erect racemes from May to July, the upper petals being all bearded, the lower ones hairy. The variety *album* has white flowers.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. brunonianum.—A rare species with a strong musky odour, native of Thibet. It is 6–12 in. high, the lower leaves being kidney-shaped and deeply divided; the upper ones 3-parted. The large light blue flowers with purple margins and black centre appear in June and July.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. cardinale (*Scarlet Larkspur*).—A handsome Californian annual 3 4 ft. high, with smooth and somewhat fleshy deeply lobed leaves. The bright scarlet flowers, with distinctly yellow petal limbs, are produced in spikes during August. Owing to its long fleshy roots, this species should be grown in a good depth of rich soil.

Culture &c. as above. Seeds sown annually.

D. cardiopetalum. — A Pyrenean annual about 1 ft. high, with smooth ternate leaves cut into linear lobes. Flowers dark bluish-violet on crowded racemes in June.

Culture &c. as above. Seeds sown annually.

D. cashmirianum.—A native of Kashmir 12–18 in. high, with palmately lobed leaves 4 in. or more across, deep green, and slightly hairy. Flowers produced in corymbs in July, of a distinct pale blue, each 1–2 in. across.

Culture &c. as above. Best increased from seed sown in autumn in cold frames. The variety *atropurpureum* has much larger and deeper coloured flowers than the type. The variety *Walkeri* is distinguished by having dull yellow petals tipped with purple.

D. caucasicum.—A Caucasian species 1½–2 ft. high, with palmately lobed and toothed radical leaves, and lance-shaped acute bracts on the floral stems. The dark blue flowers which are borne singly in the axils of the bracts are about 1½ in. across, and are produced nearly the whole length of the stem.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. cheilanthum. — A species 2–3 ft. high from Dahuria. Leaves 5-parted with oblong pointed, sub-trifid, and somewhat toothed lobes. The dark blue flowers appear in September.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. Consolida. — A European annual occasionally found wild in England, 12–18 in. high, with leaves cut into narrow linear lobes.

This and *D. Ajacis* have given rise to a great number of garden varieties.

Culture &c. as above. Seeds sown annually.

D. dasycarpum. — This hairy-fruited species is a native of the Caucasus, and is about 4–6 ft. high. The downy leaves have 5 lance-shaped lobes, somewhat trifid and deeply toothed at the apex. The rather large, beautiful blue flowers with brownish petals appear in June on simple downy racemes.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. elegans.—A N. American species 1–2 ft. high with smooth 5-parted leaves cut into cleft lobes and linear lance-shaped lobules. The dark blue flowers are borne on loose racemes in June and July. There is a double-flowered form.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. Emiliæ.—A fine Californian perennial 1½–2 ft. high. It grows upon sunny slopes in a wild state, with masses of Calochorti, and produces its trusses of deep blue flowers in June. As yet it does not appear to be well known in British gardens, and seeds have probably not yet been imported in quantity.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. exalatum (*D. elatum*).—A species 3–6 ft. high from N. America. Leaves 3–7-parted with wedge-shaped jagged lobes pointed at the apex. The blue or sometimes white flowers appear from June to August in erect spikes.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. formosum.—The native country of this fine species has not been fixed with any certainty, but it is supposed to be of Asiatic origin. It is 1½–3½ ft. high, with grey-green palmately lobed leaves, the lower ones stalked, the upper sessile and simply 3-parted. The flowers are borne on long spikes during the summer and autumn, and are of a fine azure-blue shaded with indigo; the spur is of a violet-blue, rather long, two-cleft, and rumpled looking.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. grandiflorum.—One of the most beautiful Larkspurs, growing 1–3 ft. high, and native of Siberia and Dahuria. The light green leaves are smooth above, hoary beneath, and palmately cut into many narrow lobes. The large flowers, varying in colour from blue to white, are borne on spreading few-flowered racemes from June to September, and have petals shorter than the sepals, the limb of the lower petals being entire and roundish.

There are many varieties of this species, the best of which is perhaps *chinense* or *sinense*, which differs in having a stiffer and more erect stem, and in the 2 lower petals being bearded with yellow hairs. *D. g. plenum* is a fine double-flowered variety; *album* has white flowers, of which there is also a double form. Other forms are *pallidum*, *rubrum*, *pumilum album* and *pumilum cæruleum*, the names of which give an idea of the colours.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. hybridum. — A native of Tauria, 3–4 ft. high, with many-parted linear-lobed leaves having dilated stalks sheathing at the base. The blue flowers, the 2 lower petals of which have white beards, appear on crowded racemes from June to August. The variety *ochroleucum* (also known as *albiflorum*), a native of Armenia, has whitish flowers, smooth outside.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. intermedium.—A European species 4–8 ft. high, with heart-shaped 5–7-parted leaves, the lobes of which are deeply serrated. In July and August the glaucous racemes of flowers appear, the sepals being blue, and the very hairy petals almost black. There is a great deal of variation in this species.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. laxiflorum.—A Siberian plant 4-6 ft. high. Leaves 3-7-lobed, the lobes being oblong, acute, and deeply cut; the upper leaves are more or less 3-parted with narrow entire lobes. Flowers in June, on loose branched racemes.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. mesoleucum.—The native country of this species is unknown. It grows about 3 ft. high, with somewhat downy stems, and has leaves rather dilated at the base with wedge-shaped segments, deeply serrated at the top. The flowers appear in June, having blue sepals and pale yellow or whitish petals.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. nudicaule. — A brilliant species 12–18 in. high from California. The somewhat peltate fleshy leaves are 3-parted with numerous sub-divisions, which in the lower ones are obcordate with notched lobes, and in the upper oblong entire. The flowers, which are borne on a loose raceme from May to August, have vivid red sepals inclining to orange, and clear yellow petals, the lower ones being spoon-shaped with a 2-cleft fringed lip; the upper ones elongated, prominent, hairy at the ends; the spur about twice as long as the smooth calyx. The variety *elatius* is taller growing than the species.

Culture and Propagation.—*D. nudicaule* grows best on raised ground in warm borders with light sandy soil. It is easily raised from seeds, but well-established plants may also be divided. General treatment as described above.

D. Requieni (*D. pictum*).—A biennial species about 18 in. high from S.W. Europe. Leaves on long stalks, the lower ones cut into 5 broad, wedge-shaped, 3-5-toothed lobes, the upper ones into 5 linear entire lobes. The bluish hairy flowers appear in June.

Culture &c. as above. Increased by seeds sown in cold frames as soon as ripe. The seedlings to be planted out in spring.

D. Staphisagria. — A large erect biennial 2–3 ft. high from S. Europe, with 5–9-lobed leaves. The blue flowers with whitish petals appear on loose racemes in May and have a very short spur.

Culture &c. as above. Increased by seeds sown in cold frames as soon as ripe. The seedlings to be planted out in spring.

D. tricorne.—A N. American species about 9 in. high, with 5-parted leaves cut into 3-5 narrowly divided lobes. The bright blue flowers appear in May.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. triste.—A native of Siberia, 2 ft. high, with 3–5-parted leaves, having somewhat pinnatifid sharp narrow lobes. The flowers appear on loose racemes from July to September, and are dark brown, the edges of the sepals being tinged with red, and the spur of a violet colour.

Culture &c. as above. Increased by seeds, division, or cuttings.

D. trollifolium.—A beautiful N. American Larkspur 2–4 ft. high, with stout smooth or slightly hairy stems. The long-stalked leaves are divided into 5–7 incised and toothed lobes, and the bright blue flowers with a white centre are borne in loose racemes during the early summer months in May and June.

Culture &c. as above.

D. Zalil (*D. sulphureum*).—A beautiful tuberous-rooted species 6 ft. or more high, native of Afghanistan, with deeply cut leaves and tall spikes of soft yellow flowers during the summer months.

Culture and Propagation.—Unfortunately this species is somewhat tender except in sheltered sunny places in the south. It, however, flowers and seeds freely, but has a habit of dropping its leaves when in bloom. Although a perennial, it is best to raise seedlings in gentle heat every spring so as to have young plants ready for planting out in well-manured soil at the end of May. Or the seeds may be sown in cold frames as soon as ripe, so that the seedlings will be well advanced for planting out the following spring.

ACONITUM (Aconite; Monkshood; Wolfsbane).—An extensive genus of ornamental and dangerously poisonous perennials with palmately lobed or cut leaves. Flowers in terminal racemes or panicles, blue, purple, yellowish, or white. Sepals 5, the upper one helmet-shaped, or like a monk's hood. Petals 2–5, small, the 2 upper with long claws hooded at the tip, the 3 lower minute or absent. Carpels 3–5 becoming follicles when ripe.

Culture and Propagation.—Aconites grow well in any garden soil, and if not disturbed for years will become splendid clumps, and produce masses of handsome flowers. As the roots have frequently been mistaken for Horse-Radish, care should be taken to keep the plants as far away from the kitchen garden as possible, and even from the ordinary flower borders, in case of accidents. Copses, shrubberies, or the edges of streams or ponds are suitable places for these plants to grow.

Aconites are easily increased by seeds or division of the roots in early autumn, but preferably in spring, as growth is about to commence. After performing the latter operation, the hands should be well washed as a precaution, or gloves may be used.

Aconites may also be raised from seeds sown as soon as ripe in the open border in half-shaded spots. Very often, however, they do not sprout until spring. The seedlings are pricked out into prepared soil for further growth, and allowed to remain until the autumn or the following spring before being shifted to their permanent positions.

There are a very large number of varieties, but the following are among the best for garden purposes:—

A. album. — A rare and handsome tuberous-rooted species 4–5 ft. high, native of the Levant. The large pure white flowers with erect helmet are freely produced in August.

Culture &c. as above.

A. angustifolium.—A tuberous-rooted Siberian species 2–3 ft. high, with deep blue flowers, having a closed hemispherical hood, produced in June.

Culture &c. as above.

A. Anthora.—A species, 1–2 ft. high, from the Pyrenees. The pale yellow flowers appear in July on downy panicles. There are several varieties of this species, among which may be mentioned *Decandollei*, *eulophum grandiflorum*, *Jacquini*, and *nemorosum*, all with yellow flowers.

The black roots are more or less turnip-shaped and poisonous.

Culture &c. as above.

A. autumnale.—A European species 3–4 ft. high, producing its bluish-purple flowers from July to November.

Culture &c. as above.

A. barbatum (*A. squarrosum*). — A native of Siberia, 2–6 ft. high, with hairy leaf stalks. Flowers in July, creamy yellow, rather downy, having the middle sepals densely bearded.

Culture &c. as above.

A. biflorum. — A very rare alpine species, about 6 in. high, native of Siberia. The pale blue, usually twin flowers, downy outside, appear in June.

Culture &c. as above.

A. chinense (*A. Fortunei*).—A stately Chinese species 4–6 ft. high, with very bright and intense blue flowers, borne on large compound racemes from July to September.

Culture &c. as above.

A delphinifolium. — A rare alpine species with slender stems, 6–24 in. high,

native of North America. Flowers pale bluish-purple in June.
Culture &c. as above.

A. eminens.—A European species 2–4 ft. high, producing its blue flowers in June on erect or spreading downy stalks.
Culture &c. as above.

A. gracile.—A slender-stemmed Italian species about 2 ft. high, with large pale blue or violet flowers in June.
Culture &c. as above.

A. Halleri.—A straight-stemmed branched plant, 4–6 ft. high, from Switzerland, with dense violet flowers in June. The variety *bicolor* has white flowers variegated with blue.
Culture &c. as above.

A. japonicum.—A beautiful Japanese species 2–6 ft. high, with large, flesh-coloured flowers, produced from July to September. The variety *cæruleum* has deep blue flowers.
Culture &c. as above.

A. Lycoctonum (*True Wolf's Bane*). A native of Europe, with slender upright stems 4–6 ft. high. The rather large creamy yellow flowers are borne on more or less downy and branched racemes about July and August.
Culture &c. as above.

A. Napellus (*Common Monk's Hood*). A very handsome and at the same time virulently poisonous plant, with slightly pubescent stems, 3–4 ft. high. It is found wild in England in shady places near streams, and has black spindle-shaped roots, and 5–7-parted leaves, with narrow pointed segments, the upper ones often sessile; stalks dilated at the base. The dark blue hooded flowers are borne on racemes 1–2 ft. long from July to September.

There are a large number of varieties of this species, differing chiefly in the shades of colour. One with whitish flowers is very interesting.
Culture &c. as above.

A. ochroleucum (*A. Nuttalli; A. pallidum*).—A native of Russia, 2–4 ft. high, producing its large cream-coloured flowers about July.
Culture &c. as above.

A. ottonianum.—A plant 2–4 ft. high, from the Carpathian Mountains. The blue flowers variegated with white appear in July and August.
Culture &c. as above.

A. paniculatum (*A. hebegynum*).—A native of France and Switzerland, 2–3 ft. high. The large violet flowers appear from June to September on a somewhat downy, much-branched, terminal panicle.
Culture &c. as above.

A. pyrenaicum.—A Pyrenean species 2 ft. high, with long-stalked leaves, smooth above, rather hairy beneath, and producing its large yellow flowers in June.
Culture &c. as above.

A. rostratum (*A. alpinum*).—A Swiss plant 1–2 ft. high, with violet flowers produced in June.
Culture &c. as above.

A. rubicundum.—A Siberian perennial about 3 ft. high, with very deep green foliage, and purplish flowers tinged with yellow, produced in July and August. Closely related to *A. vulparia.*
Culture &c. as above.

A. tauricum (*A. plicatum*).—A native of Germany 3–4 ft. high, with dense racemes of deep blue flowers appearing in June.
Culture &c. as above.

A. uncinatum.—A species 4–8 ft. high, from N. America, having branches arising from the axils of the trapeziform, pinnately lobed leaves. The large lilac flowers appear in July, and have a somewhat spiral spur.
Culture &c. as above.

A. variegatum.—A handsome European species 1–6 ft. high, with glistening deeply divided leaves. The large blue flowers appear in July and August, and are variegated with white.
Culture &c. as above.

A. vulparia (*A. lupicidum*).—*Foxbane.* A well-known European plant 1–3 ft. high, with 3–5-lobed, ciliated leaves. The pale yellow flowers are borne on crowded racemes about July.

There are several varieties, among which may be mentioned *carpaticum*, from the Carpathian Mountains, with lurid flowers sometimes variegated with yellow; and *septentrionale*, from Siberia, with reddish-lilac or claret-coloured flowers produced in August and September.
Culture &c. as above.

ACTÆA (Baneberry; Herb Christopher).—A small genus of erect perennial herbs, with alternate, 2-3-ternate leaves, and long erect racemes of small whitish flowers which are succeeded by poisonous berried fruits. Sepals 3-5, almost equal, petal-like, deciduous. Petals 4-10, small, clawed, spoon-shaped, flat. Stamens numerous, longer than the sepals.

Culture and Propagation.—For the ornamentation of moist, half-shady spots of the rockery or flower border, the *Actæas* are very useful. They like a rich, moist, loamy soil with the addition of peat, leaf-mould and sand, the latter being essential to keep the whole light and porous. The plants may be increased by sowing seeds as soon as ripe about the end of July or August, either out of doors in a shaded place, or in cold frames in a compost of sandy peat and loam. The seedlings are pricked out when large enough to handle, and if sturdy they may be planted in their flowering quarters by the end of September or October. It is perhaps better, on the whole, however, to wait until spring.

Actæas may also be increased by dividing the blackish roots in autumn or in spring.

A. alba (*White Baneberry*).—A North American species 12-18 in. high, with ovate-lanceolate, toothed or cut leaves, and simple racemes of white flowers in May and June. Berries white ovoid-oblong on red stalks.

Culture &c. as above.

A. spicata (*Common Baneberry* or *Herb Christopher*).—A native plant about 1 ft. high found on limestone copses. It has a stout black rootstock and leaves 2-3-ternately-pinnate and toothed. The white flowers appear in May, and are replaced by black, oblong, poisonous berries.

The variety *rubra* is a very handsome variety from N. America. It differs from the ordinary Baneberry in having bright red berries in dense clusters overtopping the leaves.

Culture &c. as above.

CIMICIFUGA (Bugwort; Bugbane).—A genus of ornamental herbaceous perennials resembling the Baneberries in habit and foliage. Flowers in racemes somewhat offensive in odour. Sepals 4-5, subequal, petal-like, deciduous. Petals 1-8, small, clawed, 2-lobed, or absent. Carpels 1-8, separate, becoming follicles when ripe.

Culture and Propagation.—These plants are easily grown in ordinary garden soil, preferably in a moist shady place, and may be used in masses. They may be increased by dividing the root in spring, or from seeds sown as soon as ripe in the same way as recommended for *Actæa* above.

C. americana.—A native of Carolina, 2-4 ft. high, with tripinnate leaves, and beautiful feathery panicles of whitish sweet-scented flowers in August and September.

Culture &c. as above.

C. cordifolia.—Also a native of North America, 2-3 ft. high, with biternate leaves, having 4-5-lobed, toothed leaflets, heart-shaped at the base. Flowers in July and August in white racemes.

Culture &c. as above.

C. elata.—This is a fetid-smelling herb about 2 ft. high, native of N. America and Siberia, in which latter country it is used on account of its offensive smell for driving away bugs. The leaves are ternate or biternate, with ovate oblong deeply toothed leaflets, and the panicled racemes of whitish flowers appear in June and July.

Culture &c. as above.

C. fœtida. — A beautiful European species 2-3 ft. high, resembling *C. americana* in habit and foliage, and bearing panicles of white flowers in July which are remarkable for their evil smell, as are also the green seed pods.

Culture &c. as above.

C. japonica.—A Japanese species 3 ft. high, with large ternate leaves cut into 5-7 heart-shaped lobes. The white unstalked flowers appear in summer on long spikes.

Culture &c. as above.

C. racemosa (*C. serpentaria; Actæa racemosa*).—This is the 'Black Snake-root' of N. America, and grows from 3 to 5 ft. high, with 3-ternate leaves, having serrated or cut leaflets. The white flowers are borne on very long compound racemes in July and August.

Culture &c. as above.

XANTHORHIZA.—A genus with only one species described below:—

X. apiifolia.—A pretty North American bush 2–3 ft. high, with long-stalked pinnate leaves, composed of 3–5 more or less ovate lance-shaped, cut, lobed, and toothed leaflets. The small dark purple and often polygamous flowers are produced in March and April in compound racemes before the leaves have developed. The flowers consist of 5 petal-like sepals, and 5 small clawed petals often broadened at the top.

Culture and Propagation. — This species will thrive in ordinary good garden soil, and may be grown in the shrubbery or border. New plants are chiefly obtained by layering the shoots in summer and autumn, or by detaching the suckers and replanting in early autumn or spring. Seeds are seldom or very rarely produced in this country.

PÆONIA (PÆONY, PEONY, or PIONY). A genus of herbaceous plants with perennial rootstocks, or branched, more or less woody stems. Leaves alternate, large, more or less finely cut or lobed. Flowers beautiful, purple, white, rose &c. Sepals 5, herbaceous, persistent. Petals 5–10, conspicuous, broad, not pitted. Carpels 2–5, surrounded by a fleshy disc; follicles dehiscent; seeds large.

HERBACEOUS PÆONIES

Culture.—Pæonies will grow freely in most soils, but being gross feeders they prefer good moist loam, which previous to planting should be well trenched and have a dressing of rotted cow manure. Plants with 2 or 3 crowns eventually make splendid specimens, and provided a good mulch of manure is placed round the crowns every winter, say in January or February, the plants need not be disturbed for several years and will produce glorious masses of flower each year during May, June, and July, according to locality. The best time for planting is early autumn —say in October—before growth has quite ceased, and late spring, about April, when growth has commenced. The crowns should not be placed deeper than 1–2 in. below the surface, and the clumps not less than 3 or 4 ft. apart. With a view to having fine plants in the future, the bloom-buds should be pinched off the first season after planting, so that all the work of the roots and leaves is devoted to building up a strong healthy specimen.

Pæonies if not 'coddled' thrive in all sorts of positions, but the flowers last longer in shaded situations, and the foliage is more luxuriant than in spots fully exposed to the sun.

If the flowers are cut just as they are about to open, they will retain their beauty and freshness a long time in water. Mixed with masses of their own foliage, they are excellent for room decoration. If the flowers, however, are cut after expanding, they last only for a short time.

Propagation. — The herbaceous Pæonies are usually increased by carefully dividing the stocks in autumn or spring. Seeds may also be sown as soon as ripe, but they are a very long time in germinating. As, however, it takes from five to eight years to obtain a really good flowering plant from seeds, this method of propagation is rarely adopted, except by large growers who make a speciality of raising novelties. The single-flowered varieties produce seeds in abundance, but the double-flowered ones, which are much more highly valued, only rarely produce seeds. The best time to sow Pæony seeds is when they are thoroughly ripe. Prepared light loamy soil in a cold frame or sheltered border is used, or the seeds may be sown in pots or pans.

P. albiflora (*P. edulis*). — This well-known species is a native of Siberia, where its roots are sometimes eaten by the Mongolian Tartars. It grows 2–3 ft. high, and has leaves at first reddish, then of a ruddy green, smooth, with oblong acute leaflets 3–4 in. long, 1–1½ in. broad. The beautiful white or pink flowers, which are bright red in bud, appear in May and June, sometimes as many as five on a slender stem, and emit a sweet Rose-like fragrance.

The best known varieties are *fragrans*, *sinensis* (*Humei*), *tatarica*, *uniflora*, *vestalis*, and *Whitleyi*.

Culture &c. as above.

P. anomala (*P. Fischeri; P. intermedia; P. sibirica*).—It is probable that the typical *P. anomala* is not in cultivation, most of the cultivated forms, according to Mr. Lynch of the Botanic Gardens, Cambridge, being derived from a variety called *insignis*. It is a native of N. Europe, Siberia &c., and has large spindle-shaped roots from which arise stems 2–3 ft. high. Leaves 10–12, cut into numerous confluent lance-shaped acute segments 1½–2 in. long, the lower leaves having 30-40. The bright crimson solitary flowers, 4 in. across, appear in May and June, the outer sepals being produced into long, often compound, leafy points. The fruits (follicles) are covered with a red or white down.

Culture &c. as above, p. 165.

P. arietina.—A native of S. Europe, 2-3 ft. high, with pale green or blue-green leaves, downy beneath, having more or less oblong or lance-shaped confluent segments. The dark red solitary flowers, about 4 in. across, appear in May, and are replaced by 3 or 4 densely woolly fruits, spreading almost horizontally from the base.

The variety *Andersoni*, which is probably a native of the Levant, has blue or glaucous-green leaves, and deep rose flowers with slightly crisped petals. The variety *cretica*, from the mountains of Crete, is one of the earliest of Pæonies, and may be recognised by its pale glaucous green leaves when springing out of the ground. The flowers are pale rose or nearly white with torn or jagged petals.

Culture &c. as above.

P. Bakeri.—A distinct species, resembling *P. triternata* in habit, and named a few years ago by Mr. Lynch, of Cambridge. It has cylindrical and somewhat spindle-shaped roots, and stout stems about 2 ft. high, reddish, flexuose, and hairy from the lowest leaf to the flower. The red-stalked leaves are biternate, with broadly ovate-acute segments about 3½ in. long, the upper surface tinted with red, the under hairy and glaucous. Flowers deep rose, over 4 in. across, with obovate slightly crisped petals, usually with a white median line beneath.

Culture &c. as above,

P. Barri (*P. Russi*, Bot. Mag. t. 2264). This is another new species created by Mr. Lynch. It has leaf segments about 5 times as long as broad, scarcely downy but very glaucous below, and brilliant red flowers produced in May. The true *P. Russi* is described on p. 167.

Culture &c. as above.

P. Broteri.—A native of Spain and Portugal, and closely related to *P. corallina.* It has cylindrical roots, reddish stems, smooth ovate pointed leaflets, broadest near the middle, and rosy-red or sometimes white flowers, appearing in May and followed by hairy fruits.

Culture &c. as above.

P. Brownei.—A rare North American species about 18 in. high, with pale green or blue-green leaves, having ternately divided or cut leaflets. The globose flowers appear in May and are about 1 in. in diameter, with dull red petals brighter on the edges.

The variety *californica* has bifid or trifid, never pinnatifid, leaflets, the apical segments being oblong, lanceolate, acute, and not glaucous.

Culture &c. as above.

P. corallina (*P. Mas*). — A native of S. Europe to Asia Minor, with spindle-shaped or knobby roots. It has reddish stems 2-3 ft. high, and smooth, deep green leaves with reddish veins, cut into more or less broadly ovate segments. The crimson or rose-red flowers appear in May, having 6-8 obovate or rounded petals 2-3 in. long.

Culture &c. as above.

P. coriacea.—A species from the S. of Spain, mountains of Morocco and Algeria. The leaves are cut into broadly ovate entire smooth leaflets, firm in texture. The flowers are large, bright crimson, appearing in May.

Culture &c. as above.

P. decora.—A Servian species related to *P. arietina*, with smooth stems 2-3 ft. high, and pale green or slightly glaucous leaves, red at the edges, smooth or slightly hairy beneath, cut into numerous oblong blunt leaflets. Flowers in May, solitary, crimson, with 6-8 petals 1½-2 in. long, and about 1 in. broad. The large hairy fruits are widely divergent.

The variety *Pallasi* has narrowly oblong leaves, while those of *elatior* are broadly oblong.

Culture &c. as above.

P. Emodi. — A fine but rather rare species from the Himalayas. It grows 2-3 ft. high, with thin, smooth, deep green leaves paler beneath, and cut into numerous lance-shaped pointed segments. The white flowers, 3-4 in. across, are produced in March from the axils of the upper leaves, and have unequal obovate petals 1½-2 in. broad, while some of the outer sepals are produced into leafy points.

Culture &c. as above. This fine Pæony requires a warm sheltered situation and thoroughly well-drained soil so that t does not suffer during the winter months from stagnant moisture at the dormant roots.

P. humilis. — A well-known garden plant 18–24 in. high, native of the S. of France. The leaves are biternate with red-tinted stalks, and are cut into numerous oblong-acute confluent segments, deep green and smooth above, pale green and downy beneath. The solitary bright red flowers appear in May on short stalks, having roundish petals 2 in. long.

Culture &c. as above.

P. hybrida, which is not a hybrid but a native of the Caucasus, may be regarded as a variety of *P. tenuifolia*. It differs, however, in not having creeping stems, and the leaf segments are somewhat broader. *P. laciniata* is a synonym.

Culture &c. as above.

P. microcarpa.—A species from the Spanish mountains, 12–18 in. high, and closely related to *P. humilis*. The red-stalked leaves are very downy beneath, and cut into numerous oblong-acute segments. The flowers are bright crimson, appearing in May.

Culture &c. as above.

P. mollis.—This is supposed to be a native of the Crimea, and grows about 12 in. high. The rigid hairy stems bear dark bluish-green much-divided leaves, densely hairy beneath. The solitary purple-red flowers appear in May, and are smaller than those of *P. officinalis*. Fruits usually 3, erect, slightly incurved, and densely hairy.

Culture &c. as above.

P. officinalis.—This native of South Europe is the most generally met with Pæony in gardens, especially the double-flowered varieties, which are very beautiful. It is 2–3 ft. high, with smooth deep green leaves, paler and sometimes downy beneath, cut into numerous lance-shaped segments, 1–2 in. broad. The solitary flowers are usually red or crimson, but there are various shades to white, all appearing in May and June.

Among the finest varieties of *P. officinalis* mention may be made of the following: *anemonæflora plena*, in which the central petals are united into an elevated tuft, the outer petals being similar to those of the single form; *purpurea plena* (also known as *fulgens* and *splendens*) has globular double flowers of a reddish-purple, the central petals being more or less narrowly strap-shaped, and raised somewhat above the outer and much larger petals; *incarnata plena* has beautiful crimson flowers which become white as they grow older; *alba plena* is a fine double white variety, as is also *maxima rosea plena*, and *striata elegans*, with deep rose-striped flowers. *P. lobata* is a dwarf form with narrower and more numerous leaf-segments. It is a native of Portugal, and may be readily recognised by its brilliant salmon-coloured flowers.

Culture &c. as above.

P. paradoxa.—A native of Southern France and Hungary, 12–18 in. high, forming dense tufts of leaves, much cut and lobed, with red margins. The flowers appear in May and June, one on a stem, and are of a purple-red colour.

This is closely related to the next species, but has smaller ovate and more glaucous leaves, with more divided, crowded, and overlapping leaflets. Cultivation, however, has produced a good many modifications of the type, and there now exist forms between the single type and those with very double flowers.

Culture &c. as above.

P. peregrina. — A well-known plant from S. Europe. It grows 1½–2 ft. high, having dull green leaves, smooth above, paler and hairy beneath, and cut into oblong acute segments, 3-4 in. long, and 1–1½ in. broad. The bright crimson flowers having 5–10 petals appear on short stalks in May and June.

Culture &c. as above.

P. pubens may be regarded as a variety, and is distinguished by its hairy stems and leaves, the latter with red margins, the leaflets tapering to a point, and flowers rosy-red. The variety *byzantina* has biternate leaves of a pale grass-green and stems covered with white hairs. *Compacta* grows only about 1 ft. high, and has very broad, overlapping leaflets with very blunt divisions, and purple-red flowers.

Culture &c. as above.

P. Russi.—A native of Corsica, Sicily, Sardinia and Algeria. It is 12–18 in. high, with spindle-shaped roots. The lower leaves are biternate, thin in texture, and cut into ovate or oblong segments. The bright crimson flowers appear in May and June.

Culture &c. as above.

P. tenuifolia.—A very distinct species 2–18 in. high, with creeping stems, and a native of Transylvania to the Crimea, Caucasus, and Armenia. The leaves are cut into very numerous linear, one-nerved segments, and at once characterise the plant. The solitary flowers with roundish sepals, and dark crimson elliptic wedge-shaped petals, appear in May and June, and are enhanced in beauty by the golden stamens with purple filaments surrounding the deep purple velvety carpels in the centre.

The handsome double varieties of *P. tenuifolia* are those most usually grown in gardens.

Culture &c. as above.

P. triternata.—A native of the Caucasus, Asia Minor, and the Crimea, 18–24 in. high. The roots are oblong or cylindrical, and the smooth leaves, pale green above, glaucous beneath, are cut into oblong leaflets, bluntly rounded at the apex and with a small cusp. The rose-red flowers are borne in May and June, one on a stem, and have 6–8 obovate petals 2–2½ in. long.

Culture &c. as above.

P. villosa (*P. sessiliflora*).—A species closely related to *P. mollis*, but having longer petioles, and white flowers.

Culture &c. as above.

P. Wittmanniana. — A distinct but somewhat rare species from the Caucasus and N. Persia. It is about 2 ft. high, with biternate leaves, usually having not more than 8 ovate deep green segments to each division, downy beneath. The flowers are borne on short stalks in April and May, and have roundish sepals and petals, the latter about 2 in. long, and of a pale yellow colour.

Culture &c. as above.

HYBRID PÆONIES.—The Pæony owes its importance as a beautiful garden plant chiefly to the fact that hundreds of first class varieties have been raised in this country and on the Continent by intercrossing a few natural species, chiefly *P. albiflora* and *P. officinalis*, although a few have sprung from *P. peregrina*; two or three from *P. tenuifolia*; what are known as the Chinese Pæonies from *P. Reevsi* and *P. Pottsi*; and the Anemone-flowered kinds which bear traces of *P. officinalis* and *P. paradoxa*.

The following is a list of the best Hybrid Pæonies grown, but as new ones appear every year, those in search of novelties may consult trade catalogues.

HARDY DOUBLE-FLOWERED CHINESE PÆONIES

Many of the following are very fragrant.

WHITE AND CREAMY YELLOW PÆONIES

Alba plenissima, pure white.

Albion, blush-white, centre primrose-yellow and white.

Alice Julvecourt, blush, passing off white, centre tinged primrose.

Candidissima, beautiful primrose-yellow, with pure white guard petals, anemone-flowered.

Comte d'Osmonte, white, tinged blush, centre bright yellow and beautifully fringed.

Countess of Clancarty, delicate blush and primrose-yellow, dwarf, erect grower.

Couronne d'Or, large creamy white, laced crimson, showing golden anthers.

Delacour Verhille, pure white, with fine broad petals, strong sturdy habit, flowers of perfect form.

Duchesse de Theba, delicate flesh-white, large broad petals.

Duke of Wellington, yellow, with large pure white guard petals, free bloomer.

Elegans superbissima, pure white, dwarf grower.

Festiva maxima, snow-white, large spreading fully double flower.

Gracchus, primrose-yellow passing off white, very large.

Hélène Leslie, primrose-yellow with large white guard petals.

Lady Dartmouth, beautiful pure white, very large.

Lady Godiva, pure white, centre tinted flesh, full-double, of highest quality.

La Tulipe, large snow-white, laced crimson.

La Vestale, white, with blush guard petals occasionally laced crimson, fine substance, strong sturdy growth.

Madame Dupont, pure white, laced crimson, full-double.

Marie Lemoine, pure white, with creamy centre, large globular-shaped flower, full-double.

Nitta, fine broad-petalled pure white flowers, a new Japanese variety.

Raiko, a new variety from Japan,

flowers large, pure white, and semi-double.

Snowball (*Duchesse de Nemours*), large snow-white, tall.

Solfaterre, beautiful primrose-yellow, passing off pure white, tall.

Triomphe de Paris, large broad white guard petals, centre primrose, passing to white, handsome flower.

Viscountess Folkestone, pure white, full-double, of finest form.

Whitleyi, pure white, tinged rose, very early.

BLUSH-PINK PÆONIES

Agnes Barr, softest of pinks, centre canary-yellow and blush, tall grower.

Arethusa, pink, passing to blush, free bloomer, tall grower.

Auguste Miellez, soft pink, interspersed with yellow, tall grower.

Belle Chatelaine, blush-pink, centre sulphur, changing to white.

Belle Douaissienne, soft rose-pink, centre primrose, passing off pure white.

Caroline Allain, blush-pink, centre flesh to white.

Ceres, soft pink guard petals, with charming fimbriated blush-white centre, pretty.

Charlemagne, blush, laced rose, full double.

Delicatissima, flesh, passing to blush-white, full-double.

Duchess of Sutherland, beautiful pink, tipped silvery-white, dwarf compact habit.

Eugène Verdier, blush, centre white, very large beautifully formed flower, tall grower, free bloomer.

Faust, blush-pink.

Figaro, pink, centre blush, laced crimson.

General Bedeau, blush-white, profuse bloomer.

Grace Darling, soft pink guard petals, centre blush, splashed crimson, petals prettily fimbriated.

Grandiflora carnea, soft flesh, early.

Humei carnea, peach-blossom, centre blush, changing to white.

Lady Ardilaun, delicate blush, centre shaded primrose, fine large flowers.

Lady Somerset, soft rose-pink, laced crimson.

Leonie, blush-white, of perfect form.

Madame Breon, colour an exquisite peach-blossom, large handsome flowers, free bloomer.

Madame de Galhau, beautiful soft pink, enormous flowers of perfect form.

Madame de Vatry, white, guard petals flesh-coloured, fragrant.

Madame Henri, peach-blossom, with prettily tessellated soft yellow centre.

Madame Loise Mère, beautiful blush-pink, large full-double flowers.

Madame Mannoir, beautiful soft pink, fully double, dwarf.

Madame Moreau, pink, with blush-white centre.

Madame Serret, delicate rose, passing to blush.

Madame Vilmorin, blush-white.

Magnifica, soft pink, centre primrose and rose.

Monsieur André, pink, centre shaded flesh.

Monsieur Paillet, soft pink, centre blush, splashed red, very pretty.

Novelty, cream, flushed pink, full-double, very early.

Paganini, primrose, passing off white, with large blush guard petals.

Prince Pierre Galitzin, peach-blossom, primrose centre, prettily fimbriated.

Princess Clotilde, beautiful peach-blossom, with creamy yellow and blush centre, fine form.

Princess May, peach, with creamy yellow and blush centre, tall grower.

Reine des Françaises, silvery-pink, interspersed with yellow, laced crimson, large flower.

Rose d'Amour, lovely blush, full-double.

Saucy Lass, lovely soft rose-pink, centre yellow, very pretty.

Taglioni, pink, centre shaded blush, large showy flowers, profuse bloomer.

The Lady, pink, laced crimson, free bloomer.

Triomphe du Nord, silvery-pink, showing the golden anthers, very pretty, tall grower.

Zoe Verniory, soft pink, centre primrose.

ROSE AND PINK PÆONIES

Alexandre Dumas, bright rose, interlaced with cream, large flower, very free bloomer.

Alice Crousse, beautiful soft rose, flesh centre.

Comte de Paris, rose-carmine, centre stained salmon, passing off blush.

Curiosa, pink, tipped white, tall grower, free bloomer.

Dr. Boisduval, rose, centre salmon.

Dr. Nestor Pelassy, rose-pink.

Globosa, bright pink, centre interlaced with flesh.

Gloire de Patrie, bright rose, tipped white, full-double.

Grandiflora superba, large bright pink guard petals, centre flesh.

Josephine Parmentier, rose, centre pink suffused salmon.

Jules Lebon, rose, full-double.

Lady Carrington, bright pink, tipped white, showing golden anthers.

Lady Leonora Bramwell, beautiful soft rose, very large full-double flowers.

L'Élégante, pink, centre shading to blush, very pretty.

Madame Courant, deep rose, edged silver, fragrant.

Madame Furtado, carmine, centre florets tinted salmon-rose.

Madame James Odier, bright rose, centre passing to blush.

Madonnis, rose, centre pink, large flower of fine form.

Marie Houillon, bright rose, full-double.

Mikado, a lovely new Japanese variety, with large bold guard petals of a beautiful cerise-rose, central florets pink edged gold.

Mons. Galland, bright pink, full-double, late.

Prince Charles, rich cerise-rose, centre tinged salmon.

Reine des Fleurs, bright rose-pink, strongly full-double.

Rose of Castile, bright rose-pink, large full-double anemone-flowered.

Rosea magna, bright rose-pink, centre pink, very effective and showy.

Sidonia, pink, shading to blush, fine large flowers.

Silenus, bright pink, full-double, free bloomer.

Sir Henry Irving, bright rose-pink, very large, of perfect form, a grand late-flowering variety.

Vicomte de Fonceville, clear pink, frilled white.

Washington, beautiful rose-cerise.

FULL DEEP ROSE PÆONIES

Abel de Pujol, full rose, shading to pink, free bloomer.

Adelaide Delache, deep rose, tipped white, profuse bloomer.

Bonaparte, brilliant rose, large loose flower, showy.

Charles Binder, bright carmine.

Charlotte Brontë, bright rose-carmine.

De Candolle, rose-pink, full-double.

Dr. Bretonneau, deep satin-rose.

Étendard du Grand Homme, brilliant rose, very large.

Isabelle Karlitzky, full rose-pink.

John Fraser, a lovely cerise-rose, full-double, of perfect form.

Madame Benard, bright rose.

Madame Lebon, rich cerise-rose, full-double, profuse bloomer.

Modeste Guerin, deep rose.

Nobilissima, rose, finely formed flower.

Sir Charles Dilke, bright rose, tipped blush, showing the golden anthers.

Sir Walter Scott, brilliant rose, shading to pink, showing golden anthers.

Souvenir de l'Exposition Universelle, beautiful rose, passing off pink.

DEEP CRIMSON PÆONIES

Buyckii, intense crimson-purple, dwarf in growth.

Delachei, very deep crimson.

Edward Simmons, large rich crimson, showing the golden anthers, tall grower.

François Ortigat, rich purple, a very richly coloured variety.

Joseph Chamberlain, rich crimson.

Lord Derby, rich purple-crimson, tall.

Lord Salisbury, flowers rich crimson, very large.

Louis Van Houtte, a fine rich purple-crimson, very handsome.

Madame Charpentier, very deep crimson, full-double, dwarf.

Madame Stair, brilliant crimson, tall grower.

Marshal MacMahon, rich full carmine, profuse bloomer.

Paul Risbourg, rich glittering crimson, late-flowering.

Prince Imperial, beautiful bright crimson, tipped purple, fine form.

Prince Prosper, glowing purple carmine, showing golden anthers, very showy.

Reine Potard, very rich glowing crimson.

Robin Hood, rich glittering crimson, showing golden anthers.

Rubra Triomphans, very rich glittering crimson.

Sir Frederick Leighton, rich crimson, tipped white.

Sir William Harcourt, rich glowing crimson, a very bright colour, tall grower.

Superbissimus, rich carmine, tall.

Besides the double-flowered Pæonies there are also many handsome forms with single flowers. Names have been given to several by specialists, but it is better to consult catalogues, as new ones are constantly being added.

TREE PÆONIES

P. lutea.—This is a new and remarkable species from Yunnan, China, and was introduced to Paris in 1887. Being of a woody nature, it now shares with *P. Moutan* the distinction of being a Tree Pæony. It is much dwarfer in growth than *P. Moutan*, and has paler green leaves with much more divided and pointed lobes, the secondary stalks being winged instead of channelled. The yellow flowers appear at the end of May and during June, and seem to be more profusely borne when the plants are grafted than when on their own roots.

Culture and Propagation. — This species is not yet well known, and but little can be said of its behaviour out of doors in cultivation. It is probably hardy in the mild southern and western districts, but would require protection in less favourable parts. The stems may be grafted in the same way as recommended below for *P. Moutan*, and the stocks mentioned there, as well as *P. corallina*, would probably give satisfactory results. This species may also be raised from seeds.

P. Moutan (*Moutan*, or *Tree Pæony*). A fine shrubby much-branched species 3-4 ft. high, native of China and Japan. The smooth leaves are cut into oblong acute segments, and in a young state assume many shades of colour, from purple-crimson to green. The very large and handsome flowers appear in May, and have a wide range of colour, white, rose, salmon, lilac, scarlet, magenta, violet &c. being represented.

Culture and Propagation. — Tree Pæonies like to grow in a good strong, more or less sandy loam, and being very gross feeders, they may with great advantage be given occasional mulchings of well-rotted cow-manure.

The shrubby varieties of the *P. Moutan* may be increased by cuttings taken in summer with a piece of the older well-ripened stem attached, and inserted singly in small pots with sandy soil, and placed in a cold, shaded frame or greenhouse. They must also be protected from frost in winter. These shrubby varieties are also grafted on the stout fleshy roots of such herbaceous kinds as *P. albiflora* and *P. officinalis*. The grafts are taken late in summer or early autumn, and should be without flower buds. Having united the graft to the root by inserting it in a slit of the latter, and binding the junction, the whole should then be potted and plunged, so as to cover up the graft a little, in ordinary soil, placed in a cold frame, and shaded until the union has become complete. Air may then be admitted, but the plants are best left undisturbed until spring. They may then be grown on in pots or transferred to the open border as required.

In some parts of the country Tree Pæonies suffer more or less from the spring frosts, especially if the previous summer has not been favourable enough to thoroughly ripen the growths. Some of the many varieties are more tender than others, and in such cases a little shelter by means of a glass frame would save the young growths and flowers in spring.

Tree Pæonies are often grown in pots, and are placed in greenhouses so that they may bloom by February. Forcing the plants out of their natural season of flowering, however, exhausts them a good deal, and plants thus treated can be used successfully for such a purpose only about every third year. If grown in pots with very rich soil, and placed in a cold greenhouse or cold frame for protection, Tree Pæonies will flower earlier than those planted out, the blooms will be much cleaner and finer, and the plants will not undergo any severe strain.

The following are among some of the best varieties grown:—

Antigonus, French white and lilac; *cælestis*, soft lilac; *Margaret Attwood*, pure white, with a yellow centre; *The Mikado*, rose and deep yellow; *Luna*, white; *Mammoth*, pink; *Morris*, soft rose; *Jupiter*, salmon; *Duhamel*, lilac-rose; *Mdme. Rattier*, cream and flesh colour.

II. CALYCANTHACEÆ—Allspice Order

Shrubs with square stems, and opposite, simple, and scabrous leaves without stipules. Flowers perigynous, axillary, solitary, and often fragrant or aromatic. Sepals and petals numerous, imbricated and combined in a fleshy tube. Stamens numerous, inserted in a fleshy rim at the mouth of the tube, the inner ones being sterile; filaments short. Carpels many, distinct, inserted in a cavity, one-celled, tapering to a filiform style. The fruit is an etærio of indehiscent one-seeded achenes.

CALYCANTHUS (ALLSPICE TREE). A genus of handsome deciduous N. American shrubs, with rather large, purple or livid sweet-scented flowers. They grow in somewhat shaded, moist soil in the warmer parts of the country, but in very cold districts may require a little protection in winter.

Culture and Propagation.—Allspice trees like a rich, well-drained sandy peat and loam, but will grow well in any good garden soil. They are useful for the shrubbery, or in beds by themselves on the grass in warm and sheltered positions, or they may be trained on walls which are overhung and shaded by tall trees. Propagation may be effected by sowing seeds in a cold frame in spring, or as soon as fully ripe. The plants may also be increased by division of the clumps or offsets, and also by layers in summer and autumn, this method being probably the easiest in our climate.

C. floridus (*Carolina Allspice*). — A native of Carolina 4–6 ft. high, with spreading branches and ovate leaves, downy beneath; the wood and roots smelling strongly of camphor. The flowers, which have a sweet apple scent, appear in May. There are several forms of this species which receive distinctive names in catalogues.

Culture &c. as above.

C. glaucus (*C. fertilis*).—This is also from Carolina, and grows about the same height as *C. floridus*. The leaves are ovate and lance-shaped, pointed, glaucous and downy beneath, and the livid purple, not strongly scented flowers appear in May. *C. oblongifolius* is a variety with somewhat elongated leaves.

Culture &c. as above.

C. lævigatus.—A shrub 3–6 ft. high with strictly erect branches, from the mountains of Pennsylvania. Leaves oblong, thin, blunt or acute, bright green, smooth, or nearly so, paler beneath. Flowers in May, livid purple, like those of *C. glaucus*.

Culture &c. as above.

C. occidentalis (*C. macrophyllus*).—This is the 'Sweet-scented Shrub' of California, and grows 6–12 ft. high, having oblong or ovate heart-shaped pointed leaves, slightly downy on the veins beneath. The brick-red sweet-scented flowers which are 3–4 in. across—each petal being about 2 in. long and ½ in. broad—are produced from June to October.

Culture &c. as above.

CHIMONANTHUS. — A genus closely related to *Calycanthus*, and containing only one species, described below, with the characters of the genus:—

C. fragrans (*Winter Sweet*). — This beautiful hardy shrub is a native of China and Japan, and was at one time also known under the name of *Calycanthus præcox*. It grows 8–10 ft. high or more in the British Islands, and from the middle of December until the end of February and March its leafless twigs are covered with sweet-scented yellow blossoms, each about 1 in. across and with a purple-brown centre. The numerous outer scale-like sepals gradually pass into petals, from which they are scarcely distinct. The stamens are in two rows, the 5 outer ones only being fertile and united at the base, the inner ones being sterile and united into a conelike tube. The leaves appear after flowering is over, and are lance-shaped, tapering in outline, slightly hairy beneath, and rather rough to the touch.

Culture and Propagation. — This charming winter-flowering plant should be grown in a deep and rich turfy loam, to which a little sand and leaf mould may be added. The soil should be well drained, as stagnant moisture at the root is not only injurious to the growth of the plant, but effectually checks the appearance of its fragrant blossoms just at a period when they are most desirable. During the late summer and autumn months the shoots may be layered, and will be well rooted by the following spring or autumn.

In most parts of the country the 'Winter Sweet' requires the protection of a wall with a south or western aspect. The shoots may be trained upon it in the same way as those of the Peach and Nectarine. After flowering is over it is essential to thin out all the old and useless shoots, so as to encourage the development of young branches during the year. It is on these young shoots, formed each year after the flowering period, that the blossoms are borne in winter, and it would be a mistake, therefore, to prune the plants in the autumn, when a good deal of such work is done. The variety *grandiflorus* is superior to the type, and has larger flowers.

III. MAGNOLIACEÆ—Magnolia or Lily Tree Order

For the most part beautiful and often aromatic trees and shrubs, with alternate, leathery, entire or toothed leaves, distinctly jointed with the stem. Stipules deciduous, but when young are rolled together, and leave ringed marks where they fall off. Flowers solitary usually hermaphrodite; sepals 3–6, deciduous; petals 3 or more, hypogynous, imbricated in several rows. Stamens numerous, hypogynous, often with dilated or thickened filaments, free, or monadelphous in male flowers. Carpels numerous, rarely few or solitary, spirally arranged upon a torus above the stamens, one-celled. Fruit either woody or fleshy, dehiscent or indehiscent.

This order includes some of the most beautiful flowering trees and shrubs in the world.

DRIMYS.—A genus of fine evergreen half-hardy trees with aromatic bark, and axillary terminal flowers. Sepals 2–3, membranaceous, cohering, deciduous. Petals 6 or more, overlapping in 2 or more rows.

D. aromatica. — A highly aromatic Tasmanian shrub, 9–12 ft. high, with oblong light green dotted leaves, tapering towards the base. The white or pinkish flowers are borne in early summer—the males on one plant, the females on another—and consist of 3 sepals and 6 (or sometimes 8) petals.

Culture &c. as for *D. Winteri.*

D. Winteri (*Wintera aromatica*).—*Winter's Bark.*—A native of S. America, where it reaches a height of 25 ft. or more. It has deep green smooth oblong obtuse leaves, glaucous beneath. The flowers, with 8–12 petals, are about 1 in. across and have a Jasmine-like perfume.

Culture and Propagation. — These two species can be grown out of doors only in the most favourable parts of England and Ireland. They require the protection of a wall, and their cultivation should not be attempted in cold districts. They thrive in sandy loam, and are propagated by inserting cuttings of the half-ripened wood in a cold frame under a glass during the summer months.

ILLICIUM (Aniseed Tree). — A genus containing only a few species of rather tender smooth evergreen shrubs or small trees, with oblong leathery stalked leaves, which emit an aromatic odour when rubbed between the hands. The yellowish or purple hermaphrodite flowers are borne either singly or in threes on the sides of the twigs. Sepals 3 or 6, membranous, in one or two series. Petals numerous, in many series. Stamen filaments rather thick. Carpels numerous, arranged star-wise on the torus, and becoming fleshy or rather woody when mature.

Culture and Propagation.—The Aniseed Trees require precisely the same cultural treatment as mentioned under

Drimys above. A rich sandy loam, with the addition of a little peat or leaf mould, will suit them all well. They can be grown out of doors with any satisfaction only in the south, and even there they do best in warm sheltered positions. New plants are obtained by placing cuttings of the ripened or half-ripened shoots in sandy soil under handlights during the summer months.

I. floridanum.—This handsome shrub is a native of Florida and other southern parts of the United States. It grows about 8 ft. high, and has oblong lance-shaped leaves somewhat tapering towards the point. The conspicuous deep purple-red flowers, each consisting of 20–30 petals, are produced during the summer months in drooping clusters, and emit a fragrant odour.

Culture &c. as above.

I. religiosum (*I. anisatum*).—This is a native of China and Japan, and grows about 4 ft. high. The branches are clothed with smooth entire leaves, and during the summer months the small yellowish-white flowers are produced in clusters, emitting a sweet odour.

This shrub is held in great reverence by the Japanese, who decorate the tombs of their friends with its branches, and burn the bark as incense.

Culture &c. as above.

MAGNOLIA (Lily Tree).—A genus of beautiful flowering trees and shrubs comprising about 20 species, some evergreen, some deciduous. Flowers conspicuous, solitary, terminal, sessile or shortly stalked, with a spathe-like bract. Petals 6-12 imbricating in 2 or more rows. Carpels numerous, oblong, borne on a more or less conical receptacle. Leaves large entire.

Culture and Propagation.—Magnolias thrive in warm sunny positions in deep rich loamy well-drained soil. When planting, which should be done in the spring just as growth begins, care should be taken to select a spot from which it will not be necessary to remove the plant for at least some years, as too frequent transplanting is detrimental.

The easiest way of increasing Magnolias in this country is by means of layers put down in summer. Seeds, when obtainable, should be sown as soon as ripe in a cold frame, and kept fairly moist until germination takes place. Cuttings of the half-ripened green shoots with a piece of older wood attached may also be struck under glass during the summer months, and should be grown under protection until well rooted and established before planting out.

Special varieties are increased by grafting them in July and August upon such stocks as the 'Cucumber Tree' (*M. acuminata*) or the 'Umbrella Tree' (*M. Umbrella*).

Some Magnolias are not so hardy as others, and practical experience is the best guide as to whether a species will grow well in a certain locality or not. Very often the spring frosts play havoc with the flowers, although the leaves are left uninjured. The kinds described below are those found most useful in this country. Many of them are useful for cultivation near large towns, as the grime and soot does little harm to the smooth foliage beyond dulling its brilliancy somewhat.

M. acuminata (*Cucumber Tree*).—A N. American vigorous deciduous tree 30–60 ft. high, with oblong acuminate leaves, downy beneath, and 6–12 in. long. The slightly scented glaucous-green flowers, tinted with yellow, are 3–4 in. across, having 6–9 petals, and appear from May to July.

Fine specimens of this tree may be seen in the Royal Gardens, Kew, at Syon House, Claremont &c.

Culture &c. as above.

M. Campbelli.—A handsome deciduous tree attaining a height of 150 ft. in its native country—India. Unfortunately it will only grow in the most favoured spots in the British Islands. At Lakeland, near Cork, is a very fine tree 35–40 ft. high, which flowered for the first time in 1883, and again in 1885.

M. Campbelli has large oval lance-shaped leaves covered with silky hairs beneath. The slightly fragrant flowers appear in April, and are 6–10 in. across, pale rose inside, crimson outside.

Culture &c. as above.

M. conspicua (*M. Yulan ; M. precia*). *The Yulan.*—A lovely deciduous Chinese species 20–40 ft. high, with obovate, abruptly pointed leaves, which are downy when young. The large erect white and fragrant flowers, with 6–9 petals suffused with crimson outside, are produced in great profusion from February to the end of June, the first flowers opening before the development of the leaves.

The variety *Soulangeana* is probably a hybrid between *M. conspicua* and *M. obovata*. Its large white flowers are deeply tinted with reddish-purple. *Soulangeana nigra* is a variety with dark plum-coloured flowers. *Lenné* is also a fine free-flowering variety said to be a hybrid between *obovata* and *conspicua*. There are other forms known as *Alexandrina*, *cyathiformis*, *speciosa*, *spectabilis*, *superba*, *triumphans* &c. scarcely distinguishable. That known as *stricta* is said to be a cross between *Soulangeana* and *obovata*.

Culture &c. as above. The flowers should be protected with canvas or matting in the event of frosty weather.

M. cordata.—A deciduous tree which grows 40–50 ft. high in N. America. Leaves heart-shaped, rather oval, acute, 4–6 in. long, smooth above, woolly beneath. The erect, scentless yellow flowers lined with purple have 6–9 oblong petals, and appear from April to July, and are about 4 in. across. Botanically this is regarded as a variety of *M. acuminata*.

Culture &c. as above.

M. Fraseri (*M. auriculata*).—A fine deciduous tree with spongy wood, native of the Southern United States, where it attains a height of 30–50 ft. The smooth, spoon-shaped leaves are a foot or more long, heart-shaped at the base, with blunt auricles, the under surface being somewhat glaucous. The erect creamy yellowish-white flowers are very sweet-scented, 3–4 in. across, and have 9 oblong petals.

Culture &c. as above.

M. glauca. — A beautiful evergreen shrub from the Eastern United States, where it reaches a height of 15 ft. or more and is known as the Laurel Magnolia or Sweet Bay. The elliptic obtuse leathery leaves are bluish-green above, silvery beneath. The fragrant globular flowers, with 9–12 oval concave petals, are about 3 in. across, and of a creamy-white when first open, changing to pale apricot with age.

The variety *major* (or *thompsoniana*) is a very vigorous form with leaves and flowers much larger than those of the type.

Culture &c. as above. A moist soil composed of peat and loam suits this species best.

M. grandiflora. — This stately evergreen tree is known as the Laurel Magnolia of the S. United States, where it attains a height of 70–80 ft. In this country there are specimens 50 ft. or more high. The oval, oblong, leathery, deep green, shining leaves with a rusty under surface are characteristic of this species. The erect sweet-scented white flowers 6–8 in. across, with 9–12 petals, are produced freely during July and August on trees which have become well-established.

The Laurel Magnolia is met with in many gardens grown either as a bush tree or trained against a wall with a south aspect, and does equally well in both positions. Cold north and easterly winds are apt to damage the young growths sometimes, and it is therefore desirable to secure a position sheltered from these as much as possible.

Culture &c. as above.

M. hypoleuca.—A fine Japanese tree, 60 ft. high or more in its native country. The leaves are 12 in. or more long, and 6–7 in. broad, deep green, smooth above, covered with white hairs beneath. The deliciously fragrant, creamy white flowers are 6–7 in. across, with a mass of brilliant scarlet stamens in the centre.

Culture &c. as above.

M. Kobus (*M. Thurberi*).—Another Japanese species 70–80 ft. high in a wild state. The leaves are 6–7 in. long, and the creamy white flowers are 4–5 in. across, and appear in May before the leaves. This species has been grown in Kew Gardens for several years.

Culture &c. as above.

M. macrophylla.—A very handsome deciduous tree with smooth white bark. It reaches a height of 30 ft. in N. America. As the name indicates, the beautiful green leaves are very large, 1–3 ft. long, 8–10 in. broad, oblong-obovate, somewhat fiddle-shaped, heart-shaped at the base, the under surface being covered with white hairs. The open bell-shaped sweet-scented flowers, with 6–9 oval petals, appear in June, and are white with a purple blotch at the base, and measure 8–10 in. across.

This species must be considered as tender except in the most favoured spots. It prefers warm soils.

Culture &c. as above.

M. obovata. — A very pretty dwarf deciduous shrub about 5 ft. high, native of China and Japan. It has large obovate dark green leaves, and Tulip-like fragrant flowers, with 6 petals, purple outside, white within, produced in great abundance in April and May.

The variety *discolor* (or *purpurea*) has larger and deeper coloured flowers than the type. There are many other garden forms differing very little from each other, the best being *Borreri*, *angustifolia*, and *erubescens*.

Culture &c. as above.

M. parviflora.—A deciduous Japanese shrub, with roundish-oval, cuspidate leaves, the stalks and principal veins of which are covered with a reddish down beneath. The almost globular white flowers tinted with rose appear about April and May.

Culture &c. as above.

M. stellata (*M. halleana*). — A beautiful dwarf-growing deciduous shrub from Japan, with obovate obtuse or elliptic shortly pointed membranous leaves, 2–5 in. long. The white sweet-scented starry flowers with numerous petals appear from March to May and before the leaves develop.

This is one of the earliest Magnolias to flower, and grown in beds as in Kew Gardens it forms a lovely sight in early spring. It rarely reaches a height of 6 or 7 feet and has a spreading bushy habit.

Culture &c. as above.

M. Umbrella (*M. frondosa; M. tripetala*).—This is the Umbrella Tree of the S. United States, and is a free-growing and somewhat straggling deciduous shrub reaching a height of 35–40 ft. in a wild state. Its smooth lance-shaped spreading leaves are 1–2 ft. long, downy underneath when young. In April and May the slightly scented white flowers, 5–8 in. across, with 9–12 petals, are freely produced.

Culture &c. as above.

M. Watsoni.—A beautiful Japanese shrub or low tree, with oblong obovate leaves about 6 in. long, deep green above, paler beneath. The creamy or ivory-white flowers, about 5–6 in. across, are borne at the tips of the young branches in June, and emit a powerful and agreeable fragrance. Each flower consists of 7 or 8 concave or incurved obovate petals, outside of which is a rosy-pink calyx, and inside which, surrounding the conical pile of carpels, are numerous rows of stamens, having rich crimson filaments and reddish-brown anthers.

Culture &c. as above. This species has been confused with *M. parviflora*, but is quite distinct.

LIRIODENDRON.—As there is only one species in this genus, it is unnecessary to give a separate generic and specific description in this case.

L. tulipifera (*Tulip Tree; Whitewood*). A very ornamental flowering tree resembling the Plane in appearance, native of the United States, having a stem sometimes over 100 ft. high and 8 ft. thick, with a greyish-brown cracked bark and many gnarled and easily broken branches. The leaves are roundish, ovate, and three-lobed, the central lobe being obliquely truncate, and forming one of the chief characteristics of the tree. It is only when mature—between 20 and 30 years of age—that the Tulip Tree produces its beautiful Tulip-like flowers of soft green and yellow at the tips of the branches in May. The flowers consist of 3 reflexed sepals, 6 connivent petals, in two imbricated rows, and two-seeded carpels in an oblong spike. There are a few well-marked varieties of the Tulip Tree now in cultivation, the best known being *aureo-maculata*, *integrifolia*, *fastigiata*, and *variegata*.

Culture and Propagation.—The Tulip Tree requires similar soil and treatment to the Magnolias, but is, on the whole, hardier. There are some splendid trees in various parts of the country, and they seem to be quite as happy as the Horse Chestnut. Young trees of various sizes are procurable from nurserymen, but plants may also be raised from seeds sown as soon as ripe in moist sandy loam in warm and sheltered spots out of doors or in cold frames. A rich loamy well-drained soil suits the Tulip Tree best, but any ordinary good garden soil will grow good specimens.

SCHIZANDRA.—A genus containing about half-a-dozen species of trailing or climbing shrubs with membranous, pellucid dotted, exstipulate leaves. Flowers 1-sexed, red, yellow, or whitish, solitary. Sepals and petals 9–12, gradually passing from one to the other. Stamens in the male flowers 5–15, more or less united into a roundish or ring-like mass. Carpels in the female flowers numerous, becoming indehiscent berries when ripe. Seeds kidney-shaped.

S. chinensis.—A handsome climbing shrub, native of China and Japan, with stems 10–20 ft. long, clothed with simple leaves, and bearing pale rosy flowers during the summer months. After blooming, the berry-like fruits appear and assume a scarlet hue when ripe, remaining on the plant for the greater part of winter.

Culture and Propagation. — This species is the only one fit for outdoor cultivation in the United Kingdom. It requires a warm sheltered position, and must be protected in northern parts during severe winters. A rich sandy loam, with a little peat or leaf soil added, suits it well. Cuttings of the more or less ripened shoots may be rooted during the summer and autumn months under handlights or in greenhouses in the same way as Drim and Illicium.

KADSURA.—A genus of climbing shrubs closely related to *Schizandra*, but having usually leathery and only rarely membranous leaves. The 1-sexed solitary flowers are borne singly in the axils of the leaves. Sepals and petals 9–15, gradually changing one into the other. Stamens in the male flowers numerous, more or less united. Carpels in the female flowers numerous, capitate, becoming berries when ripe.

K. chinensis.—A rather tender Japanese climbing shrub, with smooth, leathery, more or less oblong-oval leaves, with serrate margins, and tapering at both ends. The white flowers are borne during the summer months on stalks opposite the leaves.

Culture and Propagation.—This plant likes a warm sheltered position and flourishes in southern parts of the kingdom in rich sandy loam, peat and leaf soil. It may be increased by inserting cuttings of the more or less ripened shoots in sandy soil under handlights during the summer months.

IV. ANONACEÆ—Custard Apple Order

An order of trees and shrubs with alternate, entire, exstipulate leaves, and hermaphrodite or rarely 1-sexed flowers. Sepals usually 3, more or less distinct. Petals usually 6, hypogynous. Stamens usually numerous.

Although this order contains about 400 species, mostly natives of the tropics, the following genus is the only one that can be satisfactorily represented out of doors in the British Islands.

ASIMINA.—A small genus of shrubs or small trees, with feather-veined leaves, and nodding short-stalked flowers borne on the sides of the branches. Sepals 3, ovate, valvate. Petals 6, in 2 rows, the inner ones smaller than the outer ones. Stamens numerous. Torus (or receptacle) roundish. Carpels 3–15, becoming an oblong thickened berry when mature.

A. triloba. — A small tree or shrub about 10 ft. high, native of Pennsylvania and other parts of the United States. The leaves are smooth, oblong, wedge-shaped, and the pale purple bell-shaped flowers, about 2 in. across, with a yellow centre, are produced in early summer. The three outer broadly ovate petals are distinctly larger than the three inner ones, and the points of both series form almost an equilateral triangle.

Culture and Propagation.—This plant is best grown in southern and western parts of the kingdom in warm and sheltered situations, but is fairly hardy in the neighbourhood of London. It likes a rich sandy loam, but will also flourish in well-drained good garden soil. To obtain new plants, the branches may be layered during the summer and autumn months, and severed the following year when well rooted. Imported seeds may also be sown under glass in rich sandy loam, but the young plants should not be placed in the open air permanently until they have attained a good size, and have been well hardened and matured by exposure during the summer months.

V. MENISPERMACEÆ

An order of climbing woody or somewhat herbaceous plants with alternate, exstipulate, usually palmately nerved, entire or palmately lobed leaves. Flowers diœcious, small, usually borne in panicles, racemes, or cymes. Sepals usually 6, rarely 9 or 12. Petals usually 6, rarely fewer. Stamens in the male flowers usually equal in number and opposite to the petals, with free or united filaments. Carpels usually 3, rarely 16 or more, free. Fruit drupe-like, sessile or stalked.

COCCULUS. — A small genus of climbing or twining shrubs with ovate or oblong entire or rarely lobed leaves and flowers in cymes or axillary panicles. Sepals, petals, and stamens, 6 of each. Carpels 3. Fruit an obovoid or roundish flattened drupe.

Culture and Propagation.—The two species described below are the only ones grown out of doors in the British Islands, and are fairly hardy in the neighbourhood of London. They will grow in ordinary good and well-drained garden soil, but prefer a mixture of sandy loam, peat and leaf mould. As seeds rarely or never ripen in this country, new plants may be raised by means of cuttings of the young or half-ripened shoots inserted in sandy soil and placed in bottom heat under a bell glass during the spring and summer months.

C. carolinus. — A somewhat downy climber 10–20 ft. long, native of the Southern United States, with entire or sinuate more or less heart-shaped or ovate leaves, and greenish flowers produced in summer in axillary racemes or panicles.

Culture &c. as above.

C. laurifolius. — A compact and ornamental bush 4–8 ft. high, native of the Himalayas, Japan &c. and clothed with smooth shining oblong tapering leaves. The small white or greenish flowers are borne during the summer months.

Culture &c. as above. This species must be sheltered from cold north and east winds.

MENISPERMUM. — A genus of climbing shrubs, with deciduous, rather peltate, palmately lobed or angled leaves, and small greenish-white or yellowish flowers in panicles. Sepals 4–8 in two rows. Petals 6–8, shorter than the sepals. Stamens in the male flowers 12–24, free; in the female flowers 6, sterile. Carpels 2–4, with a dilated stigma. Fruit a more or less flattened drupe.

M. canadense. — A quick-growing Canadian climber with large handsome roundish or kidney-shaped peltate leaves and drooping racemes of small yellowish flowers produced in great abundance in summer.

Culture and Propagation. — This is a good plant for covering walls, trellises, arbours &c., so as to give them an ornamental appearance during the summer months. It likes a rich and rather damp soil and somewhat shaded situations, and may be increased by dividing the rootstocks in spring, or by inserting cuttings of the young shoots in moist sandy soil under glass at the same period. Seeds, which are ripened freely in this country, may also be sown as soon as ripe under glass, afterwards pricking the seedlings out and growing them on until large enough for the outdoor garden.

VI. BERBERIDEÆ—Barberry Order

Shrubs or herbaceous perennial plants, very often spiny. Leaves alternate, simple or often compound, and usually without stipules. Flowers solitary, racemose or panicled. Sepals 2–6, deciduous, in a double row, surrounded with petal-like scales. Petals free, hypogynous, either equal in number to the sepals and opposite to them, or twice as many. Stamens 4–6 (rarely 8) in two series, opposite the petals, hypogynous, free or sometimes monadelphous in male flowers. Carpel solitary, free, 1-celled. Fruit a capsule or berry.

LARDIZABALA.—A small genus of climbing shrubs with twice or thrice ternate leaves, having entire or sinuate-toothed leaflets. Flowers diœcious, violet or dull purple, borne on axillary peduncles, the male flowers in racemes, the female ones solitary. Sepals 6, fleshy. Petals 6, much smaller. Stamens in the male flowers 6, united in one bundle (monadelphous), and equal in number, but sterile in the female flowers. Carpels 3. Fruit an elongated oblong berry with numerous more or less kidney-shaped seeds.

L. biternata. — A handsome Chilian climber with twice ternate, deep glossy, evergreen leaves, composed of oblong acute leaflets. The small purple flowers appear late in the year but only in very favourable parts of the kingdom.

Culture and Propagation. — This is a useful climber for covering walls, over which it extends its branches often to a length of 20 ft. or more, and covers the surface with its distinct glossy foliage. It is hardy enough on a south wall in the neighbourhood of London, but becomes more luxuriant in growth in more southern and western parts. A compost of rich and light sandy loam and peat, thoroughly well drained, suits it best. New plants may be obtained by inserting cuttings of the more or less ripened shoots during the summer months in light sandy soil under glass.

STAUNTONIA.—A small genus of climbing shrubs having digitate leaves composed of 3–7 leaflets. Flowers monœcious, borne in axillary racemes. Sepals 6, petal-like, the outer ones broader than the inner. Petals none. Stamens in the male flowers 6, united in one bundle (monadelphous), equal in number in the female flowers, but sterile. Carpels 3. Fruit a roundish berry.

S. hexaphylla.—An ornamental evergreen climber, native of China and Japan, with pinnate leaves composed of 6 deep green elliptic ovate-acute leaflets. Its small whitish and sweet-scented flowers are produced in early summer.

Culture and Propagation. — This species is fairly hardy in the neighbourhood of London when grown in sheltered spots on a south wall. It, however, prefers the more genial climate of the south and west, and may be used in the same way as the *Lardizabala* for covering walls. It thrives in a rich and well-drained sandy loam or any good garden soil, and may be increased by cuttings of the more or less ripened shoots inserted in sandy soil under glass. In autumn any old or useless shoots should be cut away, leaving the younger branches.

HOLBŒLLIA. — A small genus of climbing shrubs closely related to *Stauntonia*, and differing from that genus chiefly in the purple or greenish flowers having 6 minute petals instead of none, and 6 free instead of united stamens.

H. latifolia.—This beautiful climbing evergreen is a native of the Himalayas and was once known as *Stauntonia latifolia*, a name under which it is still sometimes better known. Its stems reach a length of about 20 ft. and are covered with deep shining green leaves divided into 3 or 5 oblong leathery leaflets. In favourable parts of the country, the small greenish-purple flowers are produced in axillary clusters in early summer, and are sweetly fragrant. The variety called *angustifolia* is rarely seen, and differs from the type chiefly in having the leaves composed of from 7 to 9 linear lance-shaped leaflets.

Culture and Propagation.—This plant requires to be grown under the same conditions as *Stauntonia hexaphylla* described above. It likes similar soil and situations, and may be increased from cuttings of the ripened or half-ripened shoots in the same way.

AKEBIA.—A small genus of climbing shrubs with digitate leaves composed of 3–5 leaflets. Flowers monœcious, violet, borne in few-flowered axillary racemes. Sepals 3. Petals none. Stamens 6, free in the male flowers; in the female flowers 6–9, sterile. Carpels 3–9, with a peltate stigma. Fruit an oblong-cylindrical berry.

A. quinata.—A pretty climber 6–10 ft. high, native of China and Japan, with digitate leaves composed of 5 oblong emarginate leaflets. It produces its small violet or purplish sweet-scented flowers in early summer, in drooping racemes.

Culture and Propagation.—This ornamental plant is fairly hardy in sheltered sunny spots near London, but is much more at home in the south and west where the climate is milder. It may be trained on walls, arbours &c., and thrives best in a mixture of well-drained sandy loam, peat, and leaf soil. New plants may be obtained by dividing the roots in spring, or by cuttings of the half-ripened shoots in sandy soil under glass.

BERBERIDOPSIS.—A genus containing only one species described below.

B. corallina.—A handsome evergreen climbing shrub, native of Chili, with alternate, simple, leathery, oblong, heart-shaped leaves about 3 in. long, and furnished with spiny teeth on the margins. The scarlet or crimson-red flowers are borne in axillary clusters on slender drooping stalks during the summer, and look very handsome and brilliant. Each blossom consists of 9–15 sepals and petals scarcely distinguishable from each other, and 8–9 free stamens in the centre.

Culture and Propagation.—This is a fine plant for training on a south wall and is fairly hardy round London. It is, however, more suited for warmer localities. It will grow in ordinary good and well-drained garden soil, but prefers a rich sandy loam. Seeds are produced in good seasons and in favourable localities, and may be sown as soon as ripe or in spring under glass to obtain new plants. The branches may also be layered in the autumn; and cuttings of the young shoots may be inserted in sandy soil in spring.

BERBERIS (including MAHONIA).—BARBERRY.—A genus of about 100 species of erect or straggling yellow-wooded shrubs, with simple or compound leaves, often spiny or reduced to spines. Flowers yellow or orange, racemose or rarely solitary, or fascicled. Sepals 8–9, petal-like. Petals 6, slightly smaller, rarely larger than the sepals, often connivent, imbricated in 2 rows, and often with 2 glands at the base. Stamens 6, free. Carpel 1, with a peltate stigma. Fruit a juicy indehiscent berry.

Culture and Propagation.—Most of the Barberries are easily grown in any garden soil, and in almost any situation. They, however, prefer a rich and well-drained sandy loam, with the addition of a little peat or leaf mould, in which their roots love to ramble. Many kinds assume brilliant tints in autumn and are very effective at this season if they have been planted in bold masses.

The plants may be increased readily by means of layers and suckers in late summer or autumn. Cuttings of the ripened shoots may also be rooted in sandy soil under handlights or cold frames in autumn. The plants may be transferred to the open ground the following spring in mild showery weather.

Seeds may also be sown as soon as ripe. They must be cleaned from the juicy pulp, and sown thinly in sandy soil, but it is likely they will not sprout till the following spring. When large enough to handle easily the seedlings may be given a little more room in the seed beds, and by the autumn or following spring will be fit for another transplanting.

B. Aquifolium (*Mahonia aquifolia*). *Holly-leaved Barberry.*—A well-known shrubbery plant, 3–6 ft. high, from N. America, with Holly-like oddly-pinnate leaves which in a young state are various shades of pale green, brown, and purple. The yellow flowers appear in March and April in nearly erect and much-crowded racemes. Fruits deep purple with a 'bloom,' useful for jam making.

Culture &c. as above. This species is probably grown in larger numbers than all the others put together. Young plants are extensively used in autumn and winter for the decoration of window boxes and small gardens. Larger plants are valuable for shrubberies, banks, or, in fact, in any part of the garden where any other plant will not thrive. It stands the drip of overhanging trees well, and is equally happy in the shade or open sunshine. It is a most good-tempered plant, and will grow in the worst of soils. The foliage is largely used by florists, either in its natural state or artificially tinted a deep wine-red.

B. aristata. — This Himalayan Barberry is also known in some places as *B. macrophylla*. It grows 3–6 ft. high, and has more or less oboval, oblong or lance-shaped leaves with four or five spiny teeth, the lower spines being 3-parted. The numerous yellow flowers appear in March and April in drooping clusters and look very handsome against the smooth green and tender foliage.

Culture &c. as above.

B. buxifolia (*B. dulcis*).—*Box-leaved Barberry.*—A pretty shrub about 8 ft. high from the Straits of Magellan. Leaves almost sessile, oval or oblong, entire. Flowers solitary on slender stalks. The variety *nana* is dwarfer than the type.

Culture &c. as above.

B. canadensis (*Canadian Barberry*). A Canadian shrub 4 ft. high with obovate-oblong distantly toothed leaves, and 3-parted spines. Flowers in many-flowered nodding racemes in spring.

Culture &c. as above.

B. Darwini (*Darwin's Barberry*).—This beautiful plant is a native of S. Chili, and is perhaps the most popular and pretty of the genus. It forms a dense evergreen bush about 2 ft. high, with oval or oblong leaves about 1 in. long, having usually 5 spiny teeth. The racemes of orange flowers are produced in great profusion in May, and sometimes in the autumn, and are very conspicuous against the dark shining green foliage.

Culture &c. as above.

B. diaphana.—This is a recent introduction from China. It is a strong-growing upright shrub, with pale green leaves and handsome fruits, and also possesses sharp spines about an inch long.

Culture &c. as above.

B. empetrifolia.—A shrub 1½–2 ft. high, from the Straits of Magellan, with linear, sharply pointed leaves, in bundles of about 7. The terminal flowers are borne on slender pedicels in May.

Culture &c. as above.

B. floribunda.—A native of Nepaul, about 10 ft. high, with obovate, lance-shaped leaves, tapering much towards he base, having a sharp-pointed tip, and ciliated 3-parted unequal spines. The drooping many-flowered racemes appear in June.

Culture &c. as above.

B. Fortunei. — A pretty evergreen Chinese Barberry 2–4 ft. high. The pinnate leaves are composed of 3–4 pairs of narrow lance-shaped tapering leaflets about 4 in. long, with spiny serrated edges. They are of a distinct blue-green or glaucous hue. The yellow flowers appear in small compact clusters in spring.

Culture &c. as above.

B. Fremonti.—A handsome evergreen shrub, 3–4 ft. high, native of Texas, Arizona &c. The pinnate leaves are composed of 2–3 pairs of oblong lance-shaped leaflets, each of which is furnished with 2–3 spiny teeth. The yellow flowers appear in March and April in more or less erect loose racemes.

Culture &c. as above.

B. japonica (*Mahonia japonica*).—*Japanese Barberry.* — A distinct species native of China and Japan. Leaves usually cut into 9 sessile leaflets, about 3 in. long, broadly heart-shaped or rounded at the base, and with about 5 long spiny teeth and a terminal one. Flowers in terminal clusters in spring, lemon-yellow. *B. Beali* and *B. intermedia* are forms of this species.

Culture &c. as above.

B. Lycium.—A handsome Himalayan Barberry 6–8 ft. high, with whitish stems, and almost persistent and entire leathery leaves, green above and glaucous beneath. The golden-yellow flowers appear late in spring or early summer in drooping clusters, and are succeeded by violet-coloured berries.

Culture &c. as above. This species is quite hardy and is easily recognised even when not in blossom by its narrow entire leaves.

B. nepalensis (*Mahonia nepalensis*). A distinct and splendid species 4–6 ft. high from Nepaul. The leaves are 1–2 ft. long with 5–9 pairs of obovate-oblong cuspidate leaflets rounded at the base, and with 5–10 spiny teeth on each side, and 3 at the apex. The bright yellow flowers appear in March and April in slender elongated racemes.

Culture &c. as above.

B. pruinosa.—A dwarf Chinese shrub, of which the young growths, the under surface of the leaves, and the numerous berries are all pure white, while the flowers are pale creamy yellow.

Culture &c. as above.

B. repens (*Mahonia repens*).—A North American species 1–2 ft. high, having the leaves divided into 2 or 3 pairs of rounded-oval spiny-toothed leaflets, with an odd one at the apex. Flowers in fascicled racemes arising from the scaly buds of spring.

Culture &c. as above.

B. sinensis (*Chinese Barberry*).—A Chinese plant 3–6 ft. high, with oblong blunt, entire or slightly toothed leaves; spines 3-parted. Flowers yellow, borne in nodding racemes in May.

Culture &c. as above.

B. stenophylla. — This is supposed to be a hybrid between *B. Darwini* and *B. empetrifolia*, and its narrow abruptly pointed leaves and general habit help to confirm this opinion. It is an excellent plant for massing in groups on the grass, on banks, borders, sides of drives &c., and when bearing its garlands of bright yellow flowers, from February to April, looks really magnificent.

Culture &c. as above.

B. Thunbergi. — A handsome deciduous Japanese shrub with a low-growing spreading habit. The arching stems are furnished with straight spines and clusters of obovate or spoon-shaped leaves ½–1 in. long, which assume a glowing scarlet hue in autumn. The small drooping flowers appear in April, having red sepals and yellow petals, the latter tinged with red. In autumn they are succeeded by oblong scarlet berries, which with the foliage make this one of the most attractive of Barberries.

Culture &c. as above.

B. vulgaris, the *Common Barberry* of our copses and hedges, is a somewhat acrid shrub varying in height from 4–12 ft. It has obovate spiny-toothed leaves, and produces its many-flowered drooping racemes of yellow blossoms in spring. These are succeeded by the orange-red berried fruits which look so handsome in autumn. There is a variety called *atropurpurea* which has rich purple-red leaves and looks particularly handsome in autumn, and many others which differ but little from the type—forty-three being given in the Kew Handlist alone. The variety *asperma* with drooping clusters of scarlet oblong berries is one of the most desirable for shrubberies or fences.

Culture &c. as above.

B. wallichiana.—A handsome Nepalese shrub 6-10 ft. high, with leaves in alternate bundles, 2–3 in. long, lance-shaped, with hollowed and toothed margins. The beautiful globular yellow flowers are borne in drooping clusters in spring for some distance along the slender branches.

Culture &c. as above.

BONGARDIA.—A genus having only one species:—

B. Rauwolfi (*Leontice altaica*).—A pretty little perennial about 6 in. high, native of Central Asia, with a tuberous rootstock from which spring the pinnately cut glaucous leaves with thickish segments again twice or thrice divided or toothed with a purple blotch at the base. The golden-yellow flowers appear in May on branched pyramidal panicles, each blossom being about 1 in. across and drooping from a slender stalklet or pedicel. Sepals 3–6, petaloid. Petals 6, almost similar. Stamens 6, free.

Culture and Propagation. — This plant flourishes in light sandy soil in warm open positions in the rock garden or border. A little peat or leaf mould may be added to the soil, but in winter the rootstocks should be protected from cold heavy rains by a flower pot, bell-glass &c., otherwise the tuberous rootstocks are apt to perish. The plants may be increased by seeds sown in cold frames when ripe, or by offsets taken off in spring, or in early autumn and wintered in a cold frame.

LEONTICE (Lion's Leaf). — A genus with 3 or 4 species of tuberous-rooted herbs and leaves twice or thrice pinnately cut. Flowers yellow, in racemes or panicles. Sepals 6–9 petaloid, the outer ones smallest. Petals 6, much shorter than the sepals, truncate at the apex and nectary-bearing. Stamens 6, free.

Culture and Propagation. — These plants may be grown in the same way as *Bongardia Rauwolfi* in light sandy soil in warm sunny positions in the rockery or border. The tuberous rootstocks or corms should not be buried too deep in the soil, and during the winter months should be protected from cold heavy rains by glasses &c., or they will share the fate of the Bongardias. The plants may be increased by seeds sown in cold frames as soon as ripe, or by means of offsets taken off in early autumn and planted in cold frames until spring; or by detaching them in spring when growth has begun.

L. Alberti. — A native of Turkestan about 1 ft. high, with 5-parted digitate leaves, the lobes of which are bluntly elliptic. The golden-yellow flowers striped outside with red appear in April in conical clusters and look attractive.

Other species met with occasionally are *L. darwasica* from Bokhara, and

L. Leontopetalum, both somewhat resembling the others and requiring the same treatment.

Culture &c. as above.

CAULOPHYLLUM. — A genus having only one species:—

C. thalictroides. — An attractive perennial about 1 ft. high, native of N. America, and resembling both Bongardia and Leontice in having a tuberous rootstock. The leaves are twice or thrice pinnately cut into narrow pointed segments somewhat resembling the Thalictrums (p. 137). The yellow flowers appear in loose racemes or clusters in April, and are succeeded by roundish deep blue berries contracted at the base into a long stalk. Sepals (or bracteoles) 9, the outer ones much smaller, the inner ones petaloid. Petals 6, much smaller, nectary-bearing, dilated and hooded. Stamens 6, free.

Culture and Propagation. — This species thrives in much the same situations as the Bongardias and Leontices, but prefers a little more peat or leaf mould with the light sandy soil, and also a partially shaded place in the rockery or garden. It may be increased by separating the offsets from the tubers in early autumn and planting in a cold frame; or in spring; and also by sowing seeds if obtainable in cold frames when ripe. The rootstocks should be protected from heavy rains in winter with a sheet of glass or a handlight.

NANDINA.—A genus containing at present only one species described below with the generic characters:—

N. domestica. — A handsome erect evergreen shrub about 5 ft. high, native of China and Japan. The leaves are twice or thrice pinnately cut into entire leaflets, and the small white flowers are produced in summer in panicles at the ends of the shoots or opposite the leaves. Each blossom has numerous sepals and petals, six free stamens and one carpel, the latter eventually becoming an indehiscent berry about the size of a pea when mature.

Culture and Propagation.—This shrub is fairly hardy near London, but it is better adapted for out-door cultivation in southern and western parts of the kingdom. It thrives in ordinary and well-drained good garden soil, but prefers a mixture of good loam, peat, and leaf mould. It may be increased during the summer and autumn months by inserting cuttings of the more or less ripened shoots in sandy soil under a handlight or in a greenhouse.

VANCOUVERIA. — A genus with only one species:—

V. hexandra.—A graceful and distinct N. American perennial 1–1½ ft. high, with creeping rhizomes and pinnate leaves again twice or thrice divided into slender Fern-like segments. It produces its slender clusters of blush-coloured flowers in early summer, each blossom consisting of numerous sepals, 6 petals, and 6 free stamens.

Culture and Propagation. — This species flourishes in sandy peat, in moist and shaded parts of the rock garden, and when grown in large masses looks very effective. It may be increased by division in early autumn or spring; or by seeds sown when ripe in cold frames.

EPIMEDIUM (Barrenwort). — A genus of about 8 species of ornamental herbaceous plants with creeping perennial rhizomes and annual stems. Leaves stalked, compound, with bristly-toothed leaflets. Flowers variously coloured. Sepals 8, petaloid, flat. Petals 4, hooded or spurred. Stamens 4, free. Carpel 1.

Culture and Propagation. — The Epimediums are suitable plants for the rock-garden in somewhat shaded positions, and flourish in a compost of peat and loam in about equal proportions. In winter the withered leaves look somewhat untidy, but they serve as a protection for the young buds and should not be removed until the spring, when danger from severe frost has passed. The foliage of many kinds assumes bronzy and ruby tints in autumn.

The plants are usually increased by dividing the roots early in autumn, or better still in spring just as growth is about to commence. At this period cuttings of the roots may also be inserted in sandy peat, and if placed in gentle heat will develop roots more quickly. Seeds may also be sown in pots or pans in spring, or as soon as ripe in cold frames, and may be treated like seedling Barberries as above.

E. alpinum. — A plant 6–9 in. high, native of Central Europe, but found naturalised here and there in England on rockworks, old castle gardens &c. Leaves biternate with heart-shaped, oval-pointed, serrated leaves. Flowers in spring, 12–20 in a loose panicle, outer sepals greyish, inner ones dark crimson; petals yellow, forming a slipper-shaped spur, bearing a fancied resemblance to a bishop's mitre.

Culture &c. as above.

E. diphyllum (*Aceranthus diphyllus*). This Japanese species is the dwarfest of the genus, and rarely exceeds 3–4 in. in height. The leaves have stalks 2–3 in. long, with only 2 heart-shaped oval leaflets. The numerous small white drooping flowers appear in April and May, and have spurless petals.

Culture &c. as above.

E. macranthum (*E. grandiflorum*).—A handsome Japanese species 10–15 in. high with biternate leaves about 1 ft. long, cut into 9 heart-shaped oval leaflets 2–3 in. long with closely set hairy teeth. The white flowers appear in late spring and early summer on short racemes, and have the spur of the petals deflexed. *E. violaceum* is a dwarf variety, with smaller violet flowers. There are other forms.

Culture &c. as above.

E. musschianum.—An erect compact-growing species about 1 ft. high, native of Japan. The leaves are ternate or biternate with nine heart-shaped oval leaflets 2–3 in. long. The dull white blossoms appear in May on short, close, simple racemes.

Culture &c. as above.

E. perralderianum. — An Algerian species closely related to *E. pinnatum*. Leaves with 3 heart-shaped oval segments 2–3 in. long, bright green sometimes suffused with brown or dull purple. Flowers bright yellow ½–¾ in. across, the petals having an erect toothed blade, and an incurved strap-shaped brown spur.

Culture &c. as above.

E. pinnatum.—A handsome, vigorous Persian plant 3–24 in. high, with 3-pinnate leaves 12–18 in. long, having ovate-acute stalked leaflets, toothed on the margins. Flowers in late spring or early summer, bright golden-yellow, in loose racemes 6 in. or so long.

Culture &c. as above.

E. purpureum. — A Japanese species somewhat like *E. alpinum*, but having larger divisions to the leaves. The flowers appear in May, purplish outside, brownish-yellow within, and much larger than those of *E. alpinum*.

Culture &c. as above.

E. rubrum (*E. alpinum rubrum*).—The native country of this species is unknown. The plant is much like *E. alpinum* in habit, but is a more vigorous grower. The leaves vary from biternate to almost ternate, with sometimes as many as 20 leaflets. Flowers over ¾ in. across, with oblong deciduous greyish sepals, and inner petals bright crimson, the outer petals being pale yellow tinged with red.

Culture &c. as above.

DIPHYLLEIA.—A genus with only one species:—

D. cymosa (*Umbrella Leaf*). — A pretty N. American and Japanese perennial 12–18 in. high, with horizontal rhizomes, from which spring pairs of large roundish peltate and more or less deeply lobed leaves. The white flowers appear in summer and are borne in large loose clusters, being eventually succeeded by bluish-black berries. Each blossom consists of 6 petaloid sepals; 6 somewhat larger flat petals; and 6 free stamens.

Culture and Propagation.—This interesting plant flourishes in moist peaty soil and is thus suitable for massing in front of Rhododendrons, Azaleas, Kalmias, and other peat-loving plants of the Heath order. Or it may be grown near the margins of lakes &c. in similar soil. It may be increased in spring as growth commences by dividing the rhizomatous roots.

JEFFERSONIA. — A small genus containing only two species of perennial herbaceous plants having radical palmi-nerved leaves, mostly 2-lobed or 2-parted. Flowers white, solitary, on a naked scape. Sepals 4, petal-like. Petals 8, flat, larger than the sepals. Stamens 8, free. Carpel 1. Capsule leathery.

J. binata (*J. diphylla*).—A pretty herbaceous plant 3–6 in. high, native of the United States, with leaves deeply 2-lobed, and white flowers, having the above characters, produced in spring.

Culture and Propagation. — This species prefers a rather moist and shady situation in the rockery or flower-border, and will thrive in a soil composed of peat, sand and leaf soil. It may be increased by dividing the rootstocks in early autumn. Seeds may also be sown at the same period, or as soon as ever they are thoroughly ripe. They may be sown out of doors in a prepared bed, and when the seedlings are large enough to handle may be transplanted to their permanent positions.

PODOPHYLLUM (MAY APPLE; MANDRAKE).—A genus of two species of perennial herbs with creeping rootstocks and thick fibrous roots. Leaves peltate, palmately nerved and lobed, one or two on the stems. Flowers white, solitary, terminal, shortly stalked, nodding. Sepals 6, petal-like. Petals 6–9, flat, larger than the sepals. Stamens as many or twice as many as petals, free. Carpel 1, with a dilated peltate stigma. Fruit an indehiscent berry.

Culture and Propagation. — The Podophyllums thrive in moist, peaty soil in warm, sheltered and somewhat shady spots. They may be increased by seeds sown as soon as ripe in sandy peat, in pots or pans, and sheltered in cold frames. The following spring the seedlings may be given more room to develop, and by autumn or the next spring will probably be fit for placing in the open border or rockery. Plants may also be raised by dividing the rootstock in early autumn or spring, the latter being on the whole the most suitable period.

P. Emodi (*Himalayan May-Apple*). An erect Indian plant 6–12 in. high, with 2 alternate long-stalked leaves 6–10 in. across, 3–5-lobed to the middle or base, lobes wedge-shaped, sharply toothed, the whole surface being heavily spotted or washed with purple. Flowers in May, less than 2 in. across with very deciduous sepals, and 6 (occasionally 4) obovate oblong petals. Berries red, 1–2 in. long, elliptical, edible.

Culture &c. as above.

P. peltatum (*American Mandrake*).—A North American plant 6–12 in. high, with poisonous leaves and roots. The glossy green wrinkled leaves are 5–9-parted, with oblong, rather wedge-shaped toothed lobes. The flowerless stems end in a large round 7–9-lobed peltate leaf, like an umbrella; the flowering stems have 2 one-sided leaves with the stalk near the inner edge. The waxy-white flowers as large as those of the Christmas Rose appear in May, and have 12–18 stamens in centre. The green crab-like fruits, which are 1–2 in. long, sweet, and slightly acid, edible, ripen in July, and assume a yellowish tinge with age.

Culture &c. as above.

P. pleianthum.—A distinct and very interesting Chinese species 1–2 ft. high, with roundish peltate leaves, divided into 6–8 triangular toothed lobes. The floral leaf stems are forked, and from the axil are produced large bunches of drooping purple flowers, which in due course are succeeded by glaucous-green berries 1–2 in. long, becoming purple when ripe.

Culture &c. as above.

VII. NYMPHÆACEÆ—Water-Lily Order

Herbaceous plants growing in lakes, pools, ponds, ditches, or slow-flowing rivers, at the bottom of which their fleshy rootstocks are embedded in the mud, and their large long-stalked heart-shaped or peltate leaves float on the surface of the water. The usually large, beautiful, and often sweet-scented flowers also either float on the surface or are slightly raised above the water. There are usually 4 sepals, free or rarely adherent. Petals and stamens numerous, sometimes all free and hypogynous, often passing gradually one into another. The ovary is many-celled, with radiating stigmas, and numerous ovules, and is more or less surrounded by a large fleshy disc.

NUPHAR (YELLOW WATER-LILY; BRANDY-BOTTLE).—A small genus with three or four species, natives of the northern temperate hemisphere. The flowers are rather large and yellow, with 5–6 concave, leathery, hypogynous sepals, and numerous small stamen-like petals. Stamens numerous, shorter than the sepals, hypogynous, closely imbricated. Stigma peltate, rayed. Fruit a berry of separable carpels, ripening above water.

The Brandy-Bottles are lovely water plants, requiring the same conditions as the Water-Lilies proper, which see.

N. advena (*Nymphæa advena*). — A beautiful native of the lakes, ponds, and ditches of N. America from Canada to Carolina. Leaves erect, heart-shaped, with divaricated lobes, on half-round stalks. The large yellow flowers with red anthers in the centre rise well above the surface of the water in summer, on round stalks. There are 6 sepals, purple within, green outside.

Culture &c. as below.

N. luteum (*Yellow Water-Lily*).—A native of the still waters of Great Britain and Ireland, with roundish, deeply 2-lobed leaves 8–12 in. across. The fragrant yellow flowers appear from June to August slightly above the surface, having 5 sepals, 18–20 obovate wedge-shaped leathery petals, and 10–30 rayed stigmas. The variety *intermedium* has flowers 1⅛ in. across, with 10–14 rayed stigmas, waved at the margin.

Culture &c. as below.

N. pumilum (*Nymphæa Kalmiana*). This plant is a native of Britain, and is also distributed over Arctic and Central Europe and N. Asia. It is very similar to *N. luteum*, differing in the smaller more rounded petals, and shorter anthers. Stigmas 8–10-rayed, lobed at the margin. The yellow flowers appear from June to August.

Culture &c. as below.

NYMPHÆA (WATER-LILY).—A genus of aquatic plants with large floating deeply heart-shaped or peltate leaves. Flowers showy, solitary, red, white, blue, and intermediate shades. Sepals 4, inserted almost at the base of the torus. Petals numerous and stamens numerous, adnate to the torus, the inner petals being transformed into stamens. Carpels numerous, sunk in the fleshy disc, and with it forming a many-celled ovary, crowned by the connate radiating stigmas. Fruit a spongy berry ripening under water.

Culture and Propagation.—There are altogether between 40 and 50 species of Water-Lilies known, but most of them are too tender for out-door cultivation in the British Islands. Those described below have been found to stand our climate well, and should be grown by all who have a small piece of water at their disposal. They grow better in natural ponds, pools, or quiet streams, but may also be successfully flowered in artificial tanks sunk in the ground to a depth of about 3 ft. The rootstocks are best planted in spring in about a foot of soil beneath the water. To prevent the soil being scattered it is a good plan to have it in a shallow basket or other receptacle which will readily sink to the bottom. Casks or tubs may also be used, and if sunk level with the surface of the ground the leaves and flowers will in due course make a pretty picture during the summer and autumn months.

Water-Lilies are increased usually by dividing the tuberous rootstocks and replanting them in spring as described above. The rootstocks may be left in the mud during the winter, or they may be taken up and kept in a cool place in sand until planting time. Seeds may also be sown in autumn as soon as ripe. As the fleshy fruits and seeds ripen under water and are apt to be lost or destroyed by water-fowl or insects &c., care should be taken to secure them in good time, but not before they are thoroughly ripe. The seeds may be sown in pots or pans of loamy soil, and just submerged in water—if possible in a greenhouse where they can be attended to, or if outside, under protection. In spring, when the small round leaves appear and float on the water, each seedling may be placed in a pot by itself and again placed under water, to be grown on until the following spring. If large enough it may then be planted like the older rootstocks in a pot or tub, from which it cannot be easily lost during the dormant period.

For room decoration the blossoms are admirably adapted. If cut just as they are opening and placed in shallow bowls of water with some green foliage, they make a handsome picture. The period of their freshness may be extended by cutting half an inch or so off the end of the stalks, thus allowing a fresh layer of cells to come in contact with the water. The absorptive process goes on for a long time in this way by renewing the cuts, and the flowers retain their plumpness and brilliancy much longer in consequence.

The Queen's Water-Lily, the *Victoria Regia*, which attracts so many thousands to Kew every year, is closely related to the common hardy Water-Lily. It is a native of the Amazon River, and the circular leaves with upturned rims are often 6 ft. or more in diameter. It is raised from seed every year as described above, but the seed pots are placed in water up to 85° Fahr.

N. alba.—This is the common white Water-Lily of Great Britain and Ireland and is a beautiful early summer flowering plant, and according to locality is often in bloom in May. It has fleshy rootstocks from which arise the roundish, heart-shaped entire leaves 5–10 in. across. The scentless flowers are 4–6 in. across, and float on the surface of the water. The sepals are linear, oblong, green outside. Petals oblong, blunt. There are a few varieties, such as *candidissima*, with broad-petalled flowers; *plenissima*, with an extra number of petals; *maxima*, with larger, and *minor*, with smaller flowers than the type.

Culture &c. as above.

N. candida (*N. semiaptera*).—A Bohemian species like *N. alba* but smaller. Flowers snowy white, 2–3 in. across, sepals tinged with green.

Culture &c. as above.

N. flava.—This is a native of the South United States, and is probably hardy enough for the mildest parts of this country. It has slender rootstocks forming numerous suckers, and oblong rounded leaves, 4–6 in. long, 3–5 in. broad, shallowly crenate, and irregularly blotched with dark brown in the early part of the season. Flowers in summer, canary-yellow.

Unlike other species, *N. flava* is not quite deciduous, and the roots, if taken up, should therefore never be dried off, but be kept in damp soil or wet moss.

Culture &c. as above.

N. nitida.—A native of Siberia with heart-shaped quite entire leaves, on smooth stalks, and without prominent nerves underneath. The white scentless flowers with blunt petals appear in June, and are 3–4 in. across.

Culture &c. as above.

N. odorata.—A beautiful N. American species resembling *N. alba* but quite distinct from it. Leaves heart-shaped, entire, with nerves and veins very prominent on the under surface. The sweet-scented flowers, 6 in. across, appear from June till September, usually white, tinted with rose, and opening in the morning, but closing after midday.

The variety *rosea* or *rosacea* has beautiful flowers suffused with pink; *sulphurea* has prettily marbled leaves and sulphur-yellow flowers 8 in. across; *grandiflora* has yellow sweet-scented flowers, and leaves mottled with brown above, and spotted with red beneath; *exquisita* has flowers of a deep rosy-carmine almost red at the base of the petals; *superba* is a fine large-flowered form, and *minor* has smaller leaves and flowers than the type; *caroliniana* is said to be a cross between the variety *rosea* and *N. alba candidissima*, and is a grand variety; *gigantea*, as the name implies, has fine large flowers.

Culture &c. as above.

N. pygmæa. — This elegant species from N. Asia is the smallest of the Water-Lilies. Its heart-shaped entire leaves are little more than 3–4 in. across, and the white fragrant flowers, scarcely 2 in. across, with a greenish-yellow torus in the centre, appear from June to September. *Helvola* is a seedling from this species, raised by M. Marliac. It is a beautiful plant with pale straw-yellow flowers, and somewhat oblong leaves blotched with brown above and red beneath.

Culture &c. as above.

N. sphærocarpa.—This is closely related to *N. alba*, but has rose-carmine flowers, produced in abundance in May and June.

Culture &c. as above.

N. tuberosa.—A beautiful species from the N.E. United States. It has a creeping rootstock with oblong tubers, and circular leaves 8–18 in. in diameter, with an entire or wavy margin. The faintly scented flowers are white, 4–7 in. across, and produced in July and August. It is readily increased by dividing the roots.

The variety *rosea* has exquisite pink flowers deliciously fragrant; *Richardsoni*, which is less vigorous than the type, has pure white double flowers standing well above the water.

Culture &c. as above.

HARDY HYBRID WATER-LILIES

Besides the natural species, many beautiful hybrids have been raised during recent years, and have become exceedingly popular owing to their hardiness in our climate, and because of their free-flowering properties. The name of M. Latour Marliac, of Temple-sur-Lot, France, deserves to be recorded as the raiser of most of these beautiful Water-Lilies.

These lovely plants raised by M. Marliac may for the sake of convenience be classed into 2 groups, viz.:—*Marliacea* hybrids and *Laydekeri* hybrids, as follows:—

N. Marliacea albida. — This is the

finest and largest white Water-Lily, the flowers being fragrant and freely produced.

N. M. carnea is very vigorous and free-flowering, with magnificent flowers, flesh-tinted with a delicate blush, and scented like vanilla.

N. M. chromatella is a charming hybrid, with brown mottled leaves when young, and large fragrant flowers of clear yellow, produced from early spring till late autumn.

N. M. flammea, a splendid variety with white and reddish-purple flowers, the outer petals pink, deepening in colour towards the centre.

N. M. ignea has flowers about 5 in. across, with pale olive-green sepals edged with rose behind, and pale rose almost white in front, the closely imbricating petals being of a deep bright rosy-crimson surrounding the vivid orange-red stamens.

N. M. rosea is the choicest of the hardy pink Water-Lilies, with large cup-shaped flowers of an exquisite soft rose tint much deeper than the variety *carnea.*

N. M. rubro-punctata has flowers 4 in. across, with dark olive-green sepals, flushed with rosy-lilac in front, and deep mauve-purple petals delicately dotted with carmine.

The *Laydekeri* group contains :—

N. L. fulgens, a charming variety with dark green outer sepals and crimson-magenta petals.

N. L. fulva has creamy yellow flowers tinted and lined with bright red, the stamens being golden-yellow, and the leaves blotched with brown above and spotted with red beneath.

N. L. lilacea has lilac-rose flowers scented like Tea Roses, and about 2½ in. across.

N. L. lucida has large soft vermilion flowers, with orange stamens, and large chestnut-spotted leaves.

N. L. purpurata has symmetrical flowers of a deep rosy-crimson and vivid orange-red stamens.

N. L. rosea, flowers medium-sized, tender pink to carmine. Stamens orange-red.

Other varieties are: *Aurora,* may be called the Chameleon Water-Lily, as its exquisite flowers change in colour from day to day, being at first rose-yellow, then orange-red, ultimately becoming deep red.

N. Blanda is the purest white, with flowers 4–6 in. across, vigorous and free-flowering.

N. Ellisiana is a choice variety with brilliant carmine-purple flowers.

N. Robinsoni is a fine hybrid with deep rose-coloured flowers, deeper towards the centre, dotted with white, and with orange-red stamens.

N. Signometi is a superb variety with delicate creamy yellow flowers tinted with pale rose and carmine.

N. Andreana.—Flowers 5–6 in. above the water, brick-red, shaded with yellow ochre; stamens orange, leaf stalks spotted with chestnut, and streaked with red-brown on the back.

N. gloriosa.—A lovely scented flower 7 in. across, very double, bright red, rosy-white at the tips of the lower petals. Stamens rich red.

N. caroliniana nivea.—Flowers pure white, very large and double, very fragrant. Stamens rich yellow. *N. c. perfecta* has salmon-red flowers, very double; petals blunt and perfectly regular.

N. sanguinea.—Flowers rich carmine-amaranth or clear carmine. Stamens orange-red.

As the Hardy Water-Lilies have come into prominence only during the past few years, there is every reason to believe and hope that many fine varieties are still to be raised. Although all the above are really fine forms they are likely to be superseded by others still finer in due course.

VIII. SARRACENIACEÆ—Trumpet Leaf Order

A small natural order of remarkable and curious-looking perennial herbaceous plants, having tufts of radical leaves which are tubular or pitcher-like in form, and surmounted by a lid. The tubular portion corresponds to the stalk of ordinary leaves, but is more or less highly coloured, veined, and netted. The lid-like portion corresponds to the blade of an ordinary leaf, and is usually very beautifully coloured and netted, while on the inner surface are numerous more or less bristly hairs. These point downwards like so many miniature bayonets, and are supposed to prevent the exit of insects which find their way unimpeded to the bottom of the pitcher. The top of the latter is furnished with a strong rim, and is also provided with downward pointing bristly hairs so that the leaves are veritable death traps to the insects which frequent them for the sugary secretion which is exuded on the inner surface. Sometimes the pitchers become almost or quite filled with the dead and decaying bodies of the insects.

The flowers are few or solitary, and nodding. Sepals 4–5, free, hypogynous. Petals usually 5, free, hypogynous, but absent in the genus *Heliamphora*. Stamens numerous, hypogynous. Ovary free, 3–5-celled. Style simple, with an entire, lobed, or shield-like apex.

SARRACENIA. — This genus is known under such popular names as 'Indian Cup,' 'Pitcher Plant,' 'Side-Saddle Flower,' and 'Trumpet Leaf,' all more or less appropriate. It contains a few species of half-hardy herbaceous perennials with trumpet-like or tubular leaves as described above, and flowers borne singly at the top of a scape. Sepals 5, spreading. Petals 5, united. Ovary 5-lobed, 5-celled. The style is remarkable owing to the fact that it is dilated into a broad peltate 5-angled, umbrella-like disk, with 5 radiating nerves, the tips of which constitute the stigmatic surface where it is necessary to place the pollen for the fertilisation of the ovules and the development of seeds.

Culture and Propagation.—Most Sarracenias unfortunately are too tender to be grown out of doors successfully in the British Islands. The kind mentioned below is the best for this purpose. It enjoys a marshy spot not too much exposed to hot sunshine. A damp peaty soil in the rock garden will suit it admirably, and the addition of Sphagnum moss will also be beneficial. It will retain moisture and prevent evaporation from the soil in summer, if placed around the plants. To allow the soil to become dry is almost fatal to the plants. As they do not grow very quickly it is rather risky to attempt to increase them by division until good-sized clumps have been attained. If seeds can be obtained they may be sown under glass in moist peaty soil as soon as ripe, and the plants may be grown on in pots until they are sufficiently large and sturdy enough for the open air.

S. purpurea (*Huntsman's Cup*). — A beautiful North American species with blood-red horn-like leaves 4–6 in. long, inflated in the middle, contracted at the mouth, and surmounted with an erect kidney-shaped lid, hairy within and netted with purple veins. The purple flowers are borne in early summer, on scapes about a foot high.

There are many other kinds of Sarracenias, but they are all too tender for the open air. A large number of hybrids have been raised, and these surpass in beauty and vigour the natural species. Most of them may be seen in the greenhouses in the Royal Gardens, Kew.

Culture &c. as above.

IX. PAPAVERACEÆ—Poppy Order

Smooth and often glaucescent, or hairy annual or perennial herbaceous plants (rarely shrubs), often with a milky juice. Leaves alternate, entire, or lobed and cut without stipules. Flowers regular, usually nodding in bud, and borne singly on long stalks. Sepals 2, or 3, rarely 4, free, imbricate, caducous. Petals 4–6 rarely 8–12, hypogynous, free, in 2 or 3 series imbricated and often crumpled, deciduous. Stamens numerous, hypogynous, with slender filaments and erect anthers. Ovary 1-celled, or 2–4-celled by prolonged placentas. Stigmas as many as placentas, radiating and sessile. Fruit a pod, dehiscing by pores or valves.

PLATYSTEMON.—A genus containing only one species, viz.:—

P. californicus (*Californian Poppy*). A pretty annual about 1 ft. high, with narrow entire leaves, the lower ones alternate, the floral ones often nearly opposite or ternately verticillate. The yellow flowers are borne on elongated stalks from June to August, and consist of 3 sepals, 6 petals, numerous stamens, and carpels. The variety *leiocarpus* has smooth carpels.

Culture and Propagation.—The seeds of this species may be sown, like those of the annual Poppies, in spring or autumn, in any good garden soil, and the seedlings should be thinned out if too close together.

ROMNEYA (White Bush Poppy).—A genus containing only one species—*R. Coulteri*, the characters of which of course are those of the genus.

R. Coulteri is branched, smooth, and glaucous, perennial, 2–8 ft. high, with pinnatifid leaves, the linear lanceolate or deltoid segments of which have hairy margins. The large, fragrant, delicate white flowers, often 6 in. across when fully expanded, appear from June to September at the ends of the branches. There are 3 sepals about 1 in. long; 6 petals, broadly obovate, thickened at the base, each about 2½ in. long, and in 2 circles. Stamens numerous in many circles.

Culture and Propagation.—This fine plant is a native of California, and will grow in most parts of the British Islands. It likes a rich and somewhat sandy loam in warm and sheltered situations. During severe winters in most parts of the country north of the Thames it is wise to protect the crowns by means of litter, dry leaves, or ashes, but protection should be given only in case of real necessity, otherwise the young shoots may be too tender and be unable to stand the later spring frosts. The plants like plenty of moisture in summer, and an occasional dose of liquid manure will be very beneficial.

The easiest way to increase *Romneya Coulteri* is by sowing seed in spring either singly in small pots or in pans or boxes in a cold frame or in gentle heat. When large enough the seedlings may be pricked out into other boxes, and after being established may be hardened off for transplanting out of doors the next or even the following spring after that. Dull showery weather should, if possible, be chosen for this work. Seeds may also be sown as soon as ripe in autumn in sandy soil in cold frames or greenhouses, and the seedlings may be transplanted the following June. Sometimes the seeds remain dormant for several months after sowing.

As the plants often suffer a good deal in transplanting, it is advisable to be very careful in handling the roots, so as not to cause more injury than is necessary. For this reason it is probably the best plan to raise the plants singly in small pots, from which they may be transferred to pots of a larger size and grown on in cold frames until sturdy enough for the open border. They are more easily transferred from pots than from boxes or from the open border. Cuttings of the roots about 2 in. long, inserted in sandy soil, and placed in a hotbed early in the year, will sometimes produce plants, but cuttings of the shoots rarely root, although they keep fresh for a long time.

PAPAVER (Poppy).—A genus of about 14 species of hairy or glaucous annual or perennial herbs with milky juice, and lobed and cut leaves. The nodding showy flowers are red, violet, yellow or white, on elongated stalks. Sepals 2, rarely 3. Petals 4, rarely 6, crumpled. Stamens numerous, hypogynous. Capsule shedding its seeds by pores or valves under the ledge of the rayed and peltate stigma.

Culture and Propagation. — Poppies —both annual and perennial—are very showy plants, and owing to the difference in height, as well as their habit of growth, are suitable for various parts of the flower garden, in the front, back, or centre of beds or borders according to height. Mixed in patches with other plants, Poppies are far more effective by contrast than when grown in large patches by themselves. The annual kinds are useful for covering up mounds of earth or bare places, upon which little else will flourish. They are easily raised from seeds sown in spring or autumn in the open border where they are to bloom, the seedlings being in due course thinned out. This process of thinning out is adopted chiefly because annual Poppies do not as a rule transplant well, and as the seeds germinate so freely one can afford to dispense with the surplus seedlings. The perennial kinds may also be increased from seeds sown in spring or autumn, or by division in early autumn, so that they will have a chance to become established before winter. But they are often treated as annuals.

P. alpinum.—A beautiful alpine Poppy 3-6 in. high, with smooth or hairy leaves finely cut into acute lobed segments. Flowers in summer, yellow, rose-tinted or white, the sepals being covered with long adpressed hairs. Capsule roundish, prickly.

Culture &c. as above. Raised from seeds annually.

P. croceum. — A Siberian perennial 9-18 in. high, resembling *Meconopsis cambrica* (p. 194) in habit. It has tufts of erect radical leaves, light green above, blue-green beneath, and more or less covered with hairs. The large orange-yellow flowers appear in summer, and have the petals somewhat wavy on the margins. There is a double-flowered form of this species, which latter is now regarded as a variety of *P. nudicaule.*

Culture &c. as above. Increased by seed and division.

P. glaucum (*Tulip Poppy*).—A brilliant annual Poppy 1-2 ft. high, native of the East, with thickish blue-green leaves, oblong in shape and more or less cut into unequally toothed lobes. The showy flowers appear in summer, the two large outer petals being of a deep scarlet red, shaded with orange, while the two smaller inner ones are of a similar hue, but more or less united and forming a cup round the violet-black stamens in the centre.

Culture &c. as above. Raised annually from seed.

P. Hookeri.—An ornamental Indian species, forming a bushy herb 3-4 ft. high, and very much like the Common Corn Poppy in appearance. The flowers appear late in summer, and vary in colour from pale-rose to crimson-scarlet with a diffused white or blue-black blotch at the base.

Culture &c. as above. Raised from seeds annually.

P. horridum.—A native of Australia and S. Africa, having few-flowered hairy stems, about 2 ft. high, furnished with rigid prickles. The cut leaves are glaucous, with prickles on the nerves and tips, and the pale red flowers with hairy sepals appear in July.

Culture &c. as above. Raised from seeds annually.

P. lævigatum.—An annual Poppy 1-2 ft. high, native of the Caucasus. It has somewhat glaucous pinnately cut leaves, and large bright scarlet flowers, the petals of which have a deep black blotch at the base, and a border of white round the edges.

Culture &c. as above. Raised from seeds annually.

P. lateritium. — An Armenian perennial 1½-2 ft. high, with linear elliptic leaves, cut at the base, and 6-12 in. long. The bright orange flowers, about 2 in. across, appear in early summer, the sepals being covered with long yellow hairs.

Culture &c. as above. Increased by seeds or division.

P. nudicaule (*Iceland Poppy*). — A beautiful alpine perennial 9-18 in. high, native of Siberia, and the northern parts of America. The glaucous pinnate leaves are cut into fine acute lobed segments. The showy flowers with roundish petals and hairy sepals appear in summer, varying in colour from bright orange to yellow and white.

Culture and Propagation.—Although a perennial, the Iceland Poppy is best treated as an annual, and the seed may be sown in autumn or spring, according as the flowers are required early or late the following season. General cultivation as above.

P. orientale (*Oriental Poppy*). — A brilliant Poppy 2-3 ft. high, native of Armenia. It has rough, bristly, hairy stems and leaves, the latter being a foot or more long and pinnately cut. The deep scarlet-crimson flowers, 6-8 in. across, appear from the end of May to July, and have a black or purplish blotch at the base of each petal. The calyx has 3 sepals instead of 2 as in other species. *P. bracteatum* (often referred to as a species) is really only a variety of the Oriental Poppy. It grows, perhaps, a little taller, and has hairy deeply cut leaves with oblong serrated and deeply incised lobes, and scarlet flowers. There seem to be a good many forms in cultivation, varying between *orientale* and *bracteatum*, and it is probable that they are hybrids between these two. Other forms are *concolor*, the flowers of which have no blotch at the base, and *triumphans*, more dwarf and free-flowering.

Culture &c. as above. Easily raised from seeds sown as soon as ripe or in spring; or by dividing the plants in early autumn or spring. Plants may also be raised by cutting the fleshy roots into pieces an inch or two long, covering them with rich sandy soil, and placing under a handlight or in a greenhouse. This work is best done when the flowers have passed.

P. pavoninum (*Peacock Poppy*). — A native of Central Asia, with rather small leaves, twice pinnately cut. Flowers in summer, scarlet with a black crescent-shaped blotch at the base of each petal.

Culture &c. as above. Raised from seeds annually.

P. persicum (*Persian Poppy*). — A Persian species about 18 in. high, with pinnately cut leaves, having almost undivided often aristate segments, and brick-red flowers which appear in June.

Culture &c. as above, p. 190.

P. pilosum. — A handsome perennial 1–2 ft. high, with stem-clasping oval-oblong pale green leaves having toothed lobes, and hairy on both surfaces. The stems are also hairy and produce in summer many pale lurid scarlet or deep orange flowers, 2 in. across, with a white blotch at the base of each petal. Native of S.E. Europe.

Culture &c. as above. Increased by seeds and division.

P. Rhœas (*Common Corn Poppy; Red Weed*).—A native of British cornfields and waste places, varying a good deal in height. The common form has branched hairy stems with once or twice pinnately cut leaves, the ascending lobes of which have a bristle at the tip. The bright scarlet flowers, 3–4 in. across, appear from June to August, and have petals in unequal pairs.

The variety *umbrosum* is a native of the Caucasus, about 2 ft. high, with dazzling scarlet flowers, having a jet black blotch at the base of each petal, which is sometimes edged with grey.

Many beautiful double-flowered forms of this Poppy are now in cultivation, and are known as Carnation, Picotee, and Ranunculus-flowered, representing almost every shade of colour except blue and yellow. The French and German Poppies are also forms of this species. 'Shirley Poppies' are beautiful single-flowered variations of the common Corn Poppy, having the most exquisite and diverse shades—chiefly self-coloured, and without any blotch at the base of the petals.

Culture and Propagation.—All the varieties of the Common Corn Poppy may be sown out of doors about the end of March in the spots where they are intended to bloom. The seedlings should be thinned out to about 6–8 in. apart. To make this operation less tedious the seeds in the first place should be sown as thinly as possible.

P. rupifragum atlanticum.—A pretty Poppy 1–2 ft. high, native of Spain and Morocco, with hairy stems and bright green more or less lance-shaped leaves 6–8 in. long, and pinnately divided. The orange, red, or scarlet flowers appear in April and May, and are 2–3 in. across, erect when open but drooping like other species when in bud.

Culture &c. as above.

P. setigerum (*Bristly Poppy*). — A native of Europe and Asia 1–2 ft. high, and closely related to the Opium Poppy, but differs in having the teeth of the hairy leaves ending in a stiff bristle. The violet flowers appear in summer, but there are now many forms and various shades in gardens.

Culture &c. as above. Increased by seeds and division.

P. somniferum (*Opium Poppy*). — A beautiful annual Poppy 3–4 ft. high, widely distributed over Europe, Asia, India, W. Africa, and naturalised in many parts of the British Isles. The broad, oblong, lobed and waved leaves, with a glaucous hue, are heart-shaped at the base and clasp the smooth stems. Flowers in summer, white, rose, lilac, often striped, and usually with a dark blotch at the base of the often fringed petals.

The Pæony-flowered Poppies have been obtained by selection from this species, as has also the 'Danebrog' Poppy.

P. Musselli is a garden strain with double flowers having fringed petals. These double flowers vary a good deal in colour, and may be had in the following shades: lilac, crimson, red, purple, scarlet, rose &c.

There is also a dwarf race of Opium Poppies, which are somewhat shorter in stature and have double flowers. The variety *monstrosum* is extremely curious. Most of the numerous stamens are changed into small carpels arranged round the ordinary capsule in the form of a crown or fringe. This form comes true from seed, but there is nothing particularly handsome in it.

Culture &c. as above. Increased by seeds sown annually.

ARGEMONE (PRICKLY POPPY). — A small genus of handsome branching annuals and perennials, having yellow juice and covered with stiff prickles. Leaves stalkless, usually spotted with white; recesses spiny-toothed. Flowers about 4 in. across, showy white or yellow, terminal. Sepals 2-3 (rarely 4), concave, mucronate. Petals 4-6 (rarely 8). Stamens numerous.

Culture and Propagation. — Prickly Poppies love a warm loamy soil. They may be raised from seeds sown out of doors at the end of March, or earlier in pans placed on a hotbed, afterwards pricking out the seedlings to their flowering quarters.

A. albiflora. — An annual species, native of Georgia, 1 ft. high, with feather-veined, stalkless leaves, and white flowers, with 8 petals, produced in July and August.

Culture &c. as above.

A. grandiflora. — A perennial 2-3 ft. high from Mexico, with sinuate, smooth, glaucous and spiny-toothed leaves. Flowers in summer, large, somewhat resembling those of *Romneya Coulteri* (p. 190), white with yellowish anthers.

Culture &c. as above. Although a true perennial, this species is usually treated as a tender or half-hardy annual. The seeds are best sown in gentle heat so as to have the plants strong enough to flower early. When raised from seeds sown outside in spring, this species does not bloom till late autumn, but will flower early the following summer if protected.

A. hirsuta. — A beautiful Californian annual about 2 ft. high, with pinnatifid bristly leaves, and pure white flowers 3-5 in. across, borne in September.

Culture &c. as above.

A. mexicana (*Devil's Fig*).—A Mexican annual 2 ft. high, with hollow-edged spiny leaves blotched with white and very much resembling those of the Milk Thistle (p. 549). The solitary yellow flowers with 4-6 petals appear in June. *A. hispida* from Colorado is similar to *A. mexicana* but is much more hairy and has yellow flowers. *A. platyceras* is also closely related. It has white flowers.

Culture &c. as above. Raised from seeds annually.

A. ochroleuca. — Also a native of Mexico, with prickly stems, and deeply sinuated or pinnatifid glaucescent leaves, blotched with white, and having prickly bristles on the nerves. The pale yellow flowers with 6 petals appear in August.

Culture &c. as above. Raised from seeds annually.

MECONOPSIS.—A small genus of charming and pretty perennial, biennial, or rarely annual herbs, with yellow juice, and entire or often lobed or cut leaves. Flowers showy, yellow, purple or blue, on long stalks, nodding in bud. Sepals 2. Petals 4. Stamens numerous.

Culture and Propagation. — These plants will grow in ordinary good garden soil, and are easily raised from seeds sown in spring. If raised in pans or shallow boxes under protection from frost, the seedlings will be strong enough to plant out by the end of April or May, or they may be grown on in pots until the following spring when they will naturally be much finer in growth. When extra strong plants are required for spring planting, the seeds may be sown in cold frames or greenhouses as soon as ripe and the seedlings grown on during the winter. The plants like plenty of water in summer, but should be kept dry in winter, as at that period moisture at the roots is almost sure to kill them.

M. aculeata. — A beautiful biennial about 2 ft. high, native of N.W. India, with long-stalked, oblong, somewhat pinnate leaves, and purple flowers 2 in. across, with numerous yellow stamens in the centre. They appear in summer and look very effective in masses.

Culture &c. as above. Raised from seeds sown as soon as ripe.

M. cambrica (*Welsh Poppy*). — A beautiful native perennial about 1–2 ft. high, with pale green stalked and pinnate leaves, having toothed lobes. The erect pale yellow flowers (drooping in bud) are borne on long stalks from May to August, each one being 2–3 in. across.

Culture &c. as above. The Welsh Poppy grows freely almost anywhere, and is perhaps most suitable for semi-wild places, on old walls, ruins &c. Where it flourishes it may be left to take care of itself, as seedlings will come up naturally and replace the older plants as they die out.

M. heterophylla. — A beautiful Californian annual 12–18 in. high, remarkable for its handsome coppery orange-coloured flowers with a purple-black centre. They are produced freely in June, each blossom being about 1½ in. across, and with a delicious scent somewhat resembling that of Lily of the Valley. The flowers are not nearly so fleeting as those of other plants in this order, as they last a good time in water, especially if cut before they fully expand.

Culture &c. as above.

M. nepalensis.—A lovely free-flowering biennial from the Himalayas. It grows 3–5 ft. high, and has pale golden-yellow nodding flowers, 2–4 in. across.

Culture &c. as above. Raised from seeds sown under glass as soon as ripe. The seedlings are planted out in spring. They like warm sunny spots.

M. quintuplinervia.—A dwarf-growing compact herb 6–12 in. high, native of Manchuria, and but little known yet in British gardens. The long-stalked lance-shaped leaves are all radical and 5-nerved, the green surface being covered with reddish hairs. The violet or purple cup-shaped flowers about 1½ in. across appear in summer on hairy scapes, and have 4 rhomboid ovate petals with numerous stamens in the centre, the inner ones being twice as long as the outer ones.

Culture &c. as above.

M. simplicifolia. — A biennial from Nepal, about 3 ft. high, with tufted lance-shaped slightly toothed leaves, 3–5 in. long, covered with a dense brownish pubescence. The violet-purple flowers, 2–3 in. across, are produced in summer at the ends of unbranched stalks.

Culture &c. as above. To keep up a supply of this species a stock of plants should be raised from seeds sown under glass as soon as ripe every year. The seedlings are planted out in spring in warm sunny spots and rich moist and gritty soil.

M. Wallichi. — Perhaps the handsomest species of the genus. It is a perennial from the Himalayas, about 4–6 ft. high, with hairy pinnatifid leaves 12–15 in. long. The drooping pale blue flowers, about 2–3 in. across, are borne in June and July on erect pyramidal stems, the upper ones opening as soon as the lower ones begin to wither.

The variety *fusco-purpurea* is an effective and ornamental variety with brownish-purple flowers 2–3 in. across.

Culture &c. as above. Increased by seed and division. Although really a perennial, this fine species should be raised from seeds every year, sown either as soon as ripe in cold frames, or in spring, so that the stock may not die out. Many plants flower the second year from the date of sowing the seeds, but others do not flower for 3 or 4 years after, and then the plants usually die. Hence the necessity for raising fresh plants from seed regularly.

CATHCARTIA.—A genus with only one species, described below:—

C. villosa. — A beautiful biennial or perennial about 1 ft. high, from the Sikkim Himalayas, and somewhat resembling the Welsh Poppy. The stems and vine-shaped leaves are covered with tawny hairs, and yield a yellow juice. The rich yellow flowers are borne on long stalks in June, and have 2 sepals, 4 petals, and many stamens with conspicuous brown anthers.

Culture and Propagation.—The plants thrive in shady damp sheltered spots, and may be increased by seeds which are produced freely. They may be sown as soon as ripe in cold frames, or in spring in gentle heat, so that the plants may be ready for the open border in May.

STYLOPHORUM.—A genus consisting of three or four species of herbs with perennial rootstocks and yellow juice. Lower leaves pinnately cut or absent; upper ones few, alternate, or the floral ones nearly opposite, lobed or cut. Flowers yellow or red, on long stalks, solitary or somewhat fascicled, nodding in bud. Sepals 2. Petals 4. Stamens many.

Culture and Propagation. — The species described below thrive in ordinary garden soil. They prefer, however, a mixture of moist sandy peat and loam, and a cool half-shaded corner in the rock garden. They may be increased by dividing the roots in early autumn or spring, or from seeds sown out of doors about April or as soon as ripe.

S. diphyllum (*S. ohioense*). — *Celandine Poppy.*—A beautiful species 1 ft. high, from N.W. America, with leaves and flowers like those of the Celandine (*Chelidonium majus*), pale or glaucous beneath, smoothish. Flowers deep yellow, 2 in. across, produced freely in early summer.

Culture &c. as above.

S. japonicum (*Chelidonium japonicum*).—An elegant plant 12–18 in. high, native of Japan and N.E. Asia, with slender stems, and lower leaves long-stalked and pinnately cut. The yellow Poppy-like flowers appear in May.

Culture &c. as above.

EOMECON (CYCLAMEN POPPY).—A genus having only the following species:—

E. chionantha. — A beautiful Chinese perennial about 1 ft. high, with creeping underground roots, and pale green long-stalked and roundish shallowly lobed leaves, about 8 in. across, with a deep notch at the base, and resembling the foliage of some species of Cyclamen. The pure white flowers about 2 in. across appear from May to September, and have a bundle of deep orange stamens in the centre of the 4 roundish oblong petals. Both flower- and leaf-stalks are reddish in colour, and are effective in compact-growing specimens.

Culture and Propagation. — This pretty plant flourishes in rich and well-drained sandy loam with a little peat or leaf mould added for the sake of warmth in winter, and for retaining moisture in summer. It should be grown in warm sunny positions in the rock garden, and if necessary protected with a sheet of glass or a handlight in winter from cold and heavy rains. It may be readily increased by means of the underground creeping roots, which are about as thick as the finger and send up shoots at the tips every spring.

SANGUINARIA (BLOOD ROOT; RED PUCCOON).—A genus with only one species:—

S. canadensis.—This native of North America grows 3–6 in. high and is a distinct and pretty plant, having thick creeping rootstocks with yellow juice, and solitary, rounded, palmately veined leaves. The beautiful white flowers, one on a stem, appear in April and May, and consist of 2 sepals, 8–12 uncrumpled petals in 2 or 3 circles, and many stamens. The variety *grandiflora* has larger flowers than the type.

Culture and Propagation.—The Blood Root prefers a rather moist soil, and thrives under trees and other more or less shaded places. The rootstocks of this plant should not be taken out of the ground and dried off, as they are apt to lose their vitality by so doing.

It is increased by dividing the rootstocks in spring just as growth is about to commence. When broken, they shed a reddish juice, whence the common name of Blood Root. Seeds may also be sown in pots or pans as soon as ripe, or in spring, but it is safer not to prick the seedlings out until the leaves begin to turn yellow and he young rootstocks are going to rest.

BOCCONIA (PLUME POPPY). — A genus of tall glaucous herbs or shrubs having yellow or orange-red juice, lobed leaves, and numerous small flowers in terminal panicles, each branch and branchlet of which is furnished with a bract. Sepals 2. Petals none. Stamens many.

B. cordata (*B. japonica; Macleaya yedoënsis*). — A handsome and stately Chinese perennial 5–8 ft. high, with large glaucous deeply veined Fig-like leaves. The small buff or cream-coloured flowers are produced in great abundance during the summer and look like feathery plumes in the distance.

Culture and Propagation.—To see this plant to advantage it should be grown by itself in nooks and corners or in beds on the lawn. It is magnificent when grown in deep rich loam, and long after the flowers have passed, the flat pale brown seed pods look very handsome. When gently agitated by the wind they have a very graceful appearance.

It may be increased by dividing the thickish roots in autumn or spring. Cuttings of the young shoots from the axils of the leaves may be taken in early summer, or from the suckers which spring up round the base of the plant. The roots cut up into pieces an inch or two long will also produce young plants. They are best placed in boxes of rich sandy loam and covered over about their own diameter and placed in gentle bottom heat early in spring. The plants should be hardened off with as much air and light as possible before transferring to the open ground during dull showery weather. Seeds may also be sown as soon as ripe, preferably in cold frames or in pots or pans under glass, and the seedlings may be pricked out into light rich soil in spring.

B. frutescens is a Mexican species 8–6 ft. high, not hardy enough to stand our winters, but useful for planting out from June to September. It has large handsome sea-green lobed leaves, and masses of greenish flowers. It is best raised from seeds, and must have the protection of a greenhouse in winter.

Culture &c. as above.

B. microcarpa. — A graceful species about 9 ft. high, native of N. China. It resembles *B. cordata* in habit and foliage, and is if anything rather more ornamental and effective, and that is saying a good deal. The feathery plumes of flowers have a bronzy tint that renders it quite distinct from *B. cordata*, and its beauty is still further enhanced when in fruit.

Culture &c. as above for *B. cordata.*

GLAUCIUM (Horned Poppy).—A genus of 5 or 6 ornamental annual or biennial herbs, with yellow juice, and lobed and dissected leaves. Flowers large, yellow or crimson, on long stalks. Sepals 2. Petals 4. Stamens numerous.

Culture and Propagation. — The Horned Poppies will grow in ordinary good garden soil. They may be propagated by sowing seeds in the open air in April or May, transferring the seedlings, when large enough to handle easily, to their flowering quarters. This must be done carefully, however, as they do not like being moved. On the whole it is better to sow the seeds where the plants are required to bloom. They may be protected with a handlight or a sheet of glass over a bottomless box until sturdy enough. If sown too thickly the seedlings may afterwards be thinned out.

G. corniculatum (*G. phœniceum*).—A species from the Mediterranean region, also found naturalised in England. It is about 9 in. high, with oblong, cut, hairy leaves and crimson flowers which appear in summer and have a black spot at the base of each petal.

Culture &c. as above.

G. flavum (*G. luteum*).—A native of Britain, W. Asia and N. Africa, 1–2 ft. high, glaucous throughout, with lower leaves hairy and deeply cut, and with a beautiful silvery sheen. The large bright yellow flowers 2–4 in. across appear from June to October, the petals in opposite dissimilar pairs, and are succeeded by a smooth curved pod about a foot long. The individual blossoms do not last long, but they are produced in great abundance, a certain number opening each day.

Culture &c. as above.

G. leptopodum. — A tufted Chinese species of recent introduction. It has divided leaves and bears yellow flowers in summer.

Culture &c. as above.

CHELIDONIUM (Celandine; Swallow Wort). — A genus of erect branched herbs with yellow juice, dissected leaves, and yellow flowers. Sepals 2; petals 4; stamens numerous.

C. majus. — This is an erect branched perennial herb, native of Britain and W. Asia. Its stems reach a height of 1–2 ft., being brittle, sparingly hairy, and containing a yellow juice. The thin cut leaves are coarsely toothed, smooth beneath. The yellow flowers, about an inch across, are borne from May to August on slender stems, and have 2 sepals, 4 petals, and numerous stamens.

The variety *laciniata* has the leaves cut into linear acute lobes, the petals being also more or less cut. There is a double-flowered form.

Culture and Propagation. — The Celandine grows freely in almost any soil, but prefers moist shady places. It is a beautiful plant for the wild garden, shrubberies &c., and is easily raised from seeds sown when ripe in the open border or in spring. The roots may also be divided in autumn or spring.

DENDROMECON (Tree Poppy).—A genus with only one species at present known:—

D. rigidum. — A smooth ornamental shrub about 8 ft. high, native of the Californian mountains, with an erect and bushy habit. The more or less ovate lance-shaped stiffish leaves are 1½–2½ in. long and of a conspicuous blue-green or glaucous colour. The golden-yellow flowers, nearly 2 in. across, appear in June, the 4 roundish petals being in striking contrast to the numerous deep orange-yellow stamens in the centre.

Culture and Propagation. — This plant flourishes in a warm and sheltered position in the rock garden or ordinary flower border, and likes a rather rich and well-drained sandy loam and a little leaf soil. It may be increased by cuttings of the non-flowering shoots inserted in cold frames in sandy soil in late summer. If seeds are ripened they should be sown in cold frames at once, and the young plants may be ready in spring for the open air.

HUNNEMANNIA. — A genus containing only one species. It is closely related to Eschscholtzia, and similar in appearance and blossom. Sepals 2. Petals 4. Stamens numerous. Stigma lobes 4, short, blunt, spreading or deflexed. Capsule linear 10-ribbed.

H. fumariæfolia. — A graceful and beautiful perennial herb about 2 ft. high, native of California and Mexico. The leaves are deeply divided like those of Eschscholtzia, and have a conspicuous bluish or grey-green hue. The solitary brilliant yellow cup-shaped flowers are about 2½ in. across, and appear in August and September, the colouring of the wavy petals being enhanced by the cluster of bright orange-red stamens in the centre.

Culture and Propagation. — This beautiful plant is too tender to be treated as a perennial in the British Islands except in the south and west. It likes a warm sunny position in the flower border and is best raised annually from seeds which are produced freely. The seeds should be sown as soon as ripe in a cold frame or in shallow boxes in a cool greenhouse, but they will not sprout before the following spring. When large enough to handle they may be pricked out into light rich soil, and by the end of May or beginning of June may be planted in bold masses in the flower border.

ESCHSCHOLTZIA (Californian Poppy).—A genus of smooth, glaucescent, ornamental annual or perennial herbs with leaves much cut and divided into linear lobes. Flowers yellow on long stalks. Sepals cohering, forming a deciduous cap. Petals 4. Stamens many.

Culture and Propagation. — The Eschscholtzias are easily grown in any soil, and are useful for giving a brilliant effect to borders and shrubberies from early summer to the end of autumn. Seeds may be sown in either autumn or spring in the open border in spots where the plants are required to bloom.

There are some 4 or 5 species all natives of N.W. America, but *E. californica* and its varieties are the only ones usually grown.

E. californica.—A perennial 12–18 in. high, with glaucous finely divided leaves, and large bright orange-yellow flowers which appear in early summer. A host of garden forms have originated from this species, their flowers being white, pinkish, or pale yellow. The variety called *crocea* is a showy biennial about 1 ft. high, having deep rich orange flowers in the type. The garden forms have white, red, and striped flowers; also a double-flowered orange form. The form known as 'Mandarin' is curiously pretty.

Culture &c. as above.

E. cucullata.—A remarkable Californian species, the young leaves of which are strongly incurved or cupped. The flowers are lemon-yellow with an orange centre, but seeds are rarely produced even in a wild state. This species is probably not yet in cultivation.

Culture &c. as above.

E. Douglasi.—A Californian plant of recent introduction with flowers intermediate in size between those of *E. californica* and *E. tenuifolia.* They are bright golden-yellow with a deeper yellow or orange centre, and open a week or two earlier than those of *E. californica.*

Culture &c. as above.

E. tenuifolia is a compact-growing annual about 6 in. high, with leaves divided into threadlike segments. Flowers about 1 in. across, yellow.

Culture &c. as above.

X. FUMARIACEÆ—Fumitory Order

Annual or perennial herbs with brittle stems and a watery juice. Leaves usually alternate, much-divided, often with tendrils. Flowers irregular, purple, white or yellow. Sepals 2, small, scale-like, deciduous. Petals 4, in two usually dissimilar pairs. Stamens 4 distinct (in British species 6), hypogynous, in 2 bundles (diadelphous) opposite the 2 outer petals, one of which is usually furnished with a spur, rarely all separate. Fruit either an indehiscent 1- or 2-seeded nut, or a 2-valved or succulent indehiscent many-seeded capsule.

The irregular flowers chiefly distinguish the Fumitory Order from the Poppy Order.

HYPECOUM. — A small genus of glaucous annual herbs with leaves much cut into linear segments. Flowers white or yellow, with 2 small narrow sepals, and 4 spreading petals, the outer ones flat or slightly concave at the base. Stamens 4, opposite the petals.

H. procumbens. — A native of South Europe, about 1 ft. high, with finely cut glaucous leaves, and bright yellow flowers in summer.

Culture and Propagation. — This species will grow in any good garden soil, and may be raised from seeds sown in the open in spring, for flowering in summer, or in autumn for earlier flowering the following year.

DICENTRA (Dielytra; Diclytra). Lyre Flower; Bleeding Heart.— A genus of very ornamental, erect, diffuse, or climbing perennial herbs, with tuberous, horizontal, or fibrous roots, and much-cut, stalked leaves. Flowers in terminal racemes, rose, pink, or yellow. Sepals 2, scale-like. Petals 4, connivent, the 2 outer ones concave, saccate, or spurred at the base. Stamens 6, in two bundles opposite the outer petals.

Culture and Propagation. — The Dicentras thrive in a rich loamy soil, and are lovely plants for the border. They may be increased by dividing the rootstocks in early autumn or spring. Indeed this is the usual method of propagation. Cuttings may also be made of the fleshy roots, placed in sand and kept in a cold frame. Seeds may be sown as soon as ripe, or in spring in light sandy soil in cold frames. The young plants require to be pricked out and grown on until large enough for transferring to the open border in autumn or spring.

D. canadensis. — A North American species about 6 in. high, with glaucous finely cut leaves. The white flowers appear in May, having 2 short blunt spurs.

Culture &c. as above.

D. chrysantha.—A Californian plant with rather stiff stems 3–5 ft. high, and very finely cut glaucous foliage. The long erect branching racemes of bright yellow flowers appear in August and September.

Culture &c. as above. This species may be raised from seed, and should be planted in a warm sheltered spot. In cold localities it is desirable to cover the roots in severe winters with a little bracken or dry leaves &c.

D. Cucullaria (*Dutchman's Breeches*). A curious and not particularly beautiful dwarf species 3–6 in. high, native of the United States. It has smooth, slender, 3-ternate leaves, and produces its white, yellow-tipped flowers having 2 straight spurs in spring.

Culture &c. as above.

D. eximia (*Fumaria eximia*).—This beautiful perennial grows wild in the rocky clefts of the mountains of Virginia and N. Carolina. It is about 9–18 in. high, with divided leaves, and has compound racemes of drooping reddish-purple flowers in spring and summer and sometimes also in autumn.

Culture &c. as above.

D. formosa (*Fumaria formosa*).—A North American species, about 6 in. high, very similar to *D. eximia*, but smaller in all its parts. The bright red broadly ovate flowers appear in May and have short and very obtuse spurs.

Culture &c. as above.

D. spectabilis (*Chinaman's Breeches*). This beautiful and popular plant is a native of Siberia and Japan, and has now become well known in gardens. It is 1–2 ft. high, with stalked leaves cut into obovate wedge-shaped segments. The drooping rosy crimson flowers, about 1 in. long, are freely produced in spring and summer on gracefully arching racemes, and are more or less like inverted lyres in shape. There is a white-flowered variety which is not so effective.

This species is slightly forced in greenhouses in many thousands every year from rootstocks imported in the early autumn. As an outdoor plant there are few perennials to surpass it in the flower border, margins of shrubberies, or rough rockeries, especially if planted in rich loamy soil.

Culture &c. as above.

D. thalictrifolia (*D. scandens*). — A pretty glaucous species native of the Sikkim Himalayas, with slender creeping branches and leaves very much divided and cut as in the Meadow Rues (*Thalictrum*) into oval, oblong, or roundish leaflets. The sweet-scented yellow irregular flowers tinged with red in the throat are produced in late summer and autumn in clusters from the axils of the leaves, on long slender stalks.

Culture &c. as above.

ADLUMIA. — This genus consists only of the species here described:—

A. cirrhosa (*Corydalis fungosa*).— An interesting N. American plant with climbing stems about 15 ft. long. The pale green leaves are thrice pinnate, and resemble the fronds of Maidenhair Ferns. The pale rose or purple coloured flowers, about ½ in. long, appear in June on axillary peduncles, and consist of 2 scale-like sepals, 4 cohering petals, gibbous at the base, and 6 stamens in 2 cohering bundles opposite the outer lobes of the corolla.

Culture and Propagation. — This pretty plant is a biennial, but in warm favourable spots will be reproduced annually from self-sown seeds. Its frail climbing stems and Fern-like foliage make it a useful plant for trailing against a wall or over shrubs, old branches &c. Seeds may be sown in the ordinary way in light sandy soil as soon as ripe, and the seedlings after being pricked out must be sheltered in cold frames during the winter months. In spring they may be planted out in mild showery weather.

CORYDALIS.—A genus containing about 70 species of pretty, smooth, usually glaucous herbs, with tuberous or tufted rootstocks, and diffuse or slender stems sometimes climbing by tendrils. The leaves are much divided, alternate or almost opposite. The flowers are red, white, or yellow in terminal or leaf-opposed racemes. Sepals 2, often scale-like. Petals 4, the two outer ones larger, one or both gibbous or spurred, often cohering in two usually dissimilar pairs. Stamens 6, in 2 cohering bundles opposite the outer petals.

Culture and Propagation. — Of the many species of Fumitory comparatively few are worth growing in gardens, those described below being the best. They grow easily in ordinary garden soil, and some will thrive in shady spots in damp soil. They make charming groups in the rockery or the front of the flower border and are effective either in foliage or flower. The plants may be increased by dividing the roots after flowering or by offsets from the bulbous-rooted sorts. The annual species of course must be raised from seeds sown out of doors in early autumn or in spring each year.

C. bracteata.—A Siberian perennial about 9 in. high, with biternate leaves cut into linear-lobed segments. The sulphur-yellow flowers appear in May and June.

Culture &c. as above. Increased by division in spring.

C. cava (*C. tuberosa*).—A European perennial, 6 in. high, with biternate leaves cut into wedge-shaped segments. The white flowers are produced from February to May in loose terminal racemes.

Culture &c. as above.—Increased by division of the tuberous rootstocks in early autumn so that the plants will be established for flowering at the proper period in spring. Seeds are not produced very freely, and besides, they often do not sprout for a year or so after being sown.

C. glauca. — A graceful Canadian annual or biennial 9–12 in. high, with leaves twice pinnately cut into blunt oblong lobes, light green above, blue-green beneath. The scarlet flowers shaded with orange, and having violet sepals, are produced freely from June to September, and in conjunction with the feathery character of the foliage, produce a very ornamental effect in the rockery or flower border.

Culture &c. as above. Increased by seeds sown as soon as ripe.

C. Gortschakowi.—A glaucous green perennial 1–1½ ft. high, native of Turkestan. The leaves are twice pinnately divided or cut, the lower ones being 5–6 in. long. The golden-yellow flowers appear in summer, and are borne in close racemes.

Culture &c. as above.

C. kolpakowskiana. — A tuberous-rooted perennial from Turkestan, 6 in. high, with smooth deeply divided leaves, and long-spurred pink or purple flowers borne in summer in loose racemes.

Culture &c. as above.

C. ledebouriana.—A pretty herbaceous perennial about 1 ft. high, native of the Altai mountains. It has tuberous rootstocks and leaves twice ternately cut into obovate glaucous segments. The purple flowers appear in summer, and have rather a thick pale purple spur.

Culture &c. as above.

C. lutea (*Fumaria lutea*). — A well-known European perennial, about 1 ft. high, now naturalised on old walls in many parts of Great Britain. The pale green biternate leaves are cut into obovate wedge-shaped trifid segments, forming graceful masses. The yellow spurred flowers appear in early summer in great abundance, and continue to be produced well into September. Nestling among the foliage, which retains its freshness almost the whole year, they look very beautiful, and make the plant useful for the decoration of rockeries, ruins, old walls &c. In such places the seeds often sow themselves, and may be left to follow nature's course.

Closely related to this species is *C. ochroleuca*, which has a similar appearance, and is distinguished chiefly by its whitish-yellow flowers, which continue to appear from spring until the end of autumn.

Culture &c. as above. Increased by seeds or division.

C. Marschalliana.—A perennial 9 in. high, native of Tauria. Leaves biternate with oval entire or bifid lobes, and sulphur-yellow flowers produced in April and May.

Culture &c. as above.

C. nobilis. — A lovely Siberian perennial 9 in. or so high. Leaves twice pinnate, with wedge-shaped segments cut at the apex. Flowers in May, pale yellow, tipped with green, and having a long blunt spur incurved at the point.

Culture &c. as above. Best increased in early spring by dividing the rootstocks.

C. pallida. — A juicy herb 1–1½ ft. high, native of China and Japan. The pale green leaves are thrice pinnately cut or divided, and are blue-green on the under surface. The bright yellow flowers tipped with brown appear in summer and are borne in racemes at the ends of the shoots.

Culture &c. as above.

C. Sewerowii.—A pretty species 12–18 in. high, native of Turkestan, with very finely divided glaucous green leaves, and deep yellow flowers in April and May. Spur short, saccate, and bent downwards.

Culture &c. as above.

C. solida (*C. bulbosa*). — A tuberous perennial, 6 in. high, native of Europe, and naturalised in woods and dampish places in Britain. The very glaucous biternate leaves are cut into oblong or wedge-shaped segments, cut at the top, and the large purplish flowers about 1 in. long are produced in April and May.

Culture &c. the same as for *C. cava* above.

SARCOCAPNOS.—A small genus of dwarf-tufted glaucous perennial herbs, with dissected leaves, the lobes of which are usually broad and rather thick. Flowers white, yellow, purple, or red, in few-flowered terminal racemes. Sepals 2, scale-like. Petals 4, connivent, one of the two outer ones spurred at the base, the other flat, the inner ones narrow and cohering at the apex, keeled or winged behind. Stamens 6, in 2 cohering bundles opposite the outer petals.

S. enneaphylla.—A native of S. Europe, 2–6 in. high, with slender stems and thrice ternately parted and much-lobed leaves on slender stalks. The small yellow flowers marked with purple appear in June.

Culture and Propagation. — This species thrives in ordinary soil, and is suitable for borders or rockeries. Easily increased by seeds or division of the roots in the same way as *Corydalis* (see above). Cuttings of the shoots may also be made to root under handlights or cold frames during the summer months if inserted in light sandy soil, and kept shaded and fairly damp at first.

FUMARIA (Fumitory).—A genus of about 40 species of annual (rarely perennial) herbs usually branched, often climbing. Leaves much divided, with very narrow segments. Racemes terminal or opposite the leaves. Sepals 2, scale-like. Petals 4, erect, conniving, the lower one gibbous or spurred at the base, the upper flat, the two inner ones narrow, cohering at the tip, winged or keeled behind. Stamens 6, in 2 bundles opposite the 2 outer petals.

F. capreolata.—This is the only species worth growing. It is indigenous to the fields and waste places of Britain, Europe, and Asia, and may be grown in the wild gardens or border. It grows about 4 ft. high and has bipinnate glaucous leaves climbing by twisted stalks, and racemes of white, purple-tinted flowers from May to September. There are several forms.

Culture &c. as recommended above for *Corydalis*. Seeds may be sown in autumn or spring.

XI. CRUCIFERÆ—Wallflower Order

Annual, biennial, or perennial herbaceous plants, rarely undershrubs. Flowers hermaphrodite, regular, usually yellow or white, occasionally purple, generally in racemes, and without bracts. Sepals 4, deciduous, imbricate or valvate in bud, the 2 lateral ones often saccate at the base. Petals 4, placed crosswise, and alternate with the sepals. Stamens 6 (tetradynamous), of which 2 are shorter and opposite the lateral sepals, hypogynous. Disk with various green glands opposite the sepals, and between the petals, stamens, and ovary. Ovary superior, one-celled, but apparently two-celled, owing to the parietal placenta meeting in the middle, and forming a spurious dissepiment. Fruit a long (siliqua) or short (silicula) 2-celled and 2-valved capsule or pod, opening by two valves, leaving the seeds on the persistent placentas (known as a *replum*, well seen in Honesty), or indehiscent.

MATTHIOLA (Stock).—An important genus of about 80 species of branching annual, biennial, or perennial herbs, or sub-shrubs, with oblong or linear, entire or sinuate downy leaves. Flowers in racemes, often purple, generally sweet-scented. Sepals erect, the lateral ones saccate at the base. Petals with long claws. Fruit-pod a roundish or compressed siliqua, with the lobes of the stigma connivent, thickened or horned at the back. The various garden Stocks, such as Ten Week, Intermediate, Brompton, or Queen Stocks &c., will be considered under the natural species from which they have been derived.

The plant known as 'Virginian Stock' is described under *Malcolmia maritima* (see p. 214).

M. annua.—The Ten Week and Intermediate Stocks have arisen from this species. It is an annual 1-2 ft. high, native of S. Europe, with erect, branching stems, furnished with lance-shaped, blunt hoary leaves. The flowers appear from May to October on erect racemes, and vary a good deal in size and colour.

Ten Week Stocks

There are many kinds of Ten Week Stock mentioned in catalogues, and they are all more or less worth growing. For cut flowers, Ten Week Stocks are most useful from early summer to autumn, and cutting the main flower spikes often induces the development of the side shoots, which would otherwise remain latent.

Culture and Propagation. — During March the seed may be sown thinly in shallow pans or boxes placed on a gentle hotbed. In a short time the seedlings will be sufficiently large to handle easily. They may then be pricked out into similar pans or boxes, filled with rich loamy soil and well drained. Give the plants as much light and air as possible, to make them hard and sturdy. By the end of May or beginning of June, when all danger of frost is past, the plants may be placed where they are to bloom. The richer the soil, the better the plants will bloom and the more brilliant the colours, which are white, lemon, pink, rose, scarlet, purple, crimson, violet, with numerous shades of each. If there is no convenience for raising Ten Week Stocks under glass, the seeds may be sown in the open border about the end of April. Plants raised in this way, however, must not be transplanted, as the season in most parts of the country is scarcely extended enough to permit of full development. The seedlings are best thinned out, leaving the most promising plants to flower where the seed has been sown. Among the kinds grown may be mentioned the Dwarf, Large-flowered, Giant, Wall-flower, Victoria, and Pyramidal Ten Week Stocks in various colours.

In order to obtain dwarf, sturdy, bushy plants the leading shoot may be pinched out as soon as the flower-buds begin to swell. By this means growth will be retarded in the main shoot, but will be accelerated in the side ones, each of which becomes longer and bears numerous blossoms.

Seeds may be saved, but only from the single-flowering varieties. But as a rule seed saved in most parts of the United Kingdom is of little use, and it is much better to raise plants from the best imported seeds. To secure a large percentage of double-flowered varieties, it is, however, better to obtain well-ripened and imported seeds from a nurseryman.

INTERMEDIATE STOCKS

These are also derived from the Common Stock, *Matthiola annua*, and are chiefly confined to scarlet, white, and purple varieties. They are very useful for flowering in spring before the ordinary Ten Week Stocks. To secure them at this season, the seeds should be sown in July and August; the seedlings will thus have plenty of time to become well established and hardened to stand the winter. Where glass protection is available, the plants may be grown one or more in a pot, wintered in a cold frame or greenhouse, with as much light and air as possible, when they will make fine bushy plants for early spring flowering.

EAST LOTHIAN STOCKS

This is a form of the Intermediate variety of *Matthiola annua* and is chiefly valuable for producing its flowers in the autumn, after most of the Ten Week Stocks are finished. The seeds may be sown about the end of March or April, and when large enough transplanted in the usual way. By using the Intermediate, Ten Week, and East Lothian Stocks in rotation as named, it is possible to have Stocks in bloom for the greater part of the year.

M. bicornis.—This is a branched sub-shrub, native of Greece, and somewhat tender in the least favourable parts of the country. It has oblong lance-shaped cut leaves, the upper ones being entire. The flowers are purplish-red like those of the Wallflower-leaved Stock (*M. incana*), but smaller, and nearly sessile, with oblong spoon-shaped petals, appearing in spring.

Culture &c. as for the Brompton Stocks below (see *M. incana*).

M. fenestralis.—A sub-shrub about 1 ft. high, native of Crete. It has erect simple stems with crowded, obovate, downy leaves, and scarlet or pale purple flowers produced in July and August, on a long erect raceme, sometimes slightly branched at the base. Only comparatively few double-flowered varieties are obtained from seeds.

Culture &c. as for the Brompton Stocks below.

M. incana (*Wallflower-leaved Stock; Brompton* and *Queen Stock*).—This grows in a wild state in W. Europe, the Canaries, the Levant &c., to a height of 1 or 2 ft., having branched sub-shrubby stems with erect, hoary, oblong, lance-shaped leaves, and flowers 1-2 in. across in summer varying from purple to violet.

Culture &c. as below.

BROMPTON STOCKS

These are vigorous growing biennials with handsome flowers of purple, scarlet, white, or crimson. They are not quite hardy in all parts of the British Islands, and where there is a likelihood of the plants suffering during the winter, they should be planted under the protecting branches of trees and shrubs, which will shield them a good deal from the effects of frost.

Culture and Propagation.—Brompton

Stocks are biennial and therefore require two seasons' growth to come to perfection. The seeds may be sown in pans or boxes in June or July. When the seedlings are an inch or so high, they may be transferred to a piece of freshly dug ground and planted 8–12 in. apart. Should the plants be inclined to make a too vigorous and sappy growth, they should be lifted and again transplanted. This will check the growth, and help to harden the plants for the coming winter. This second transplanting often saves the plants from being killed outright in severe winters.

In the north and naturally cold localities it is on the whole safer to winter Brompton Stocks in cold frames, and have them transplanted in spring. If grown in pots they may with advantage be brought into blossom earlier by placing in the gentle heat of a greenhouse.

In the south of England and Ireland Brompton Stocks, if raised from seed sown in spring in gentle heat, will in warm and favourable seasons flower the same year. Some forty or fifty years ago Brompton Stocks were cultivated extensively in the market gardens around London, but for many years past they have disappeared altogether from this region. In the south and in the Channel Islands, however, they are still grown very largely, and from the latter place some fine trusses of bloom are sent to the London markets every year.

QUEEN STOCKS

These Stocks are supposed to be identical with Brompton Stocks and may receive the same treatment. It is said, however, that the seeds are darker than those of the Brompton Stock, and that its leaves are rough and woolly on the under side, while those of the Brompton are smooth on both sides.

WALLFLOWER-LEAVED STOCK

This is a variety of the biennial kind, readily distinguished by having smooth bright shiny green leaves like Wallflowers instead of dull-coloured downy ones like the other Stocks. It may be treated like the Brompton or Queen Stock referred to above.

M. tricuspidata.—An annual about 1 ft. high, from the shores of the Mediterranean. It has oblong, toothed or sinuate leaves, the upper ones being more divided or cut. The bright lilac flowers, lighter towards the base, appear in summer, and the entire plant is more or less pubescent.

Culture &c. as for Ten Week Stocks above, p. 201.

M. tristis (*Hesperis tristis*).—*Night-scented Stock.*—An interesting biennial from E. Europe, 9–24 in. high. Lower leaves stalked, upper ones ovate, acute, stalkless, entire or toothed, smooth or downy, pale green, 2–4 in. long. Flowers in spring and summer, varying from a dull white to a dull dark purple, usually fragrant in the evening, and scenting the atmosphere for many yards round.

Culture and Propagation. — This sweet-scented Stock flourishes in moist but well-drained garden soil of a loamy nature. It is raised from seeds sown out of doors as soon as ripe, or in the early spring under glass or in gentle heat. In the latter case the seedlings will flower the same year in favourable parts; but autumn-sown seedlings are pricked out and transferred so as to flower the following year. Imported seeds may also be sown as recommended for the Wallflower below.

PARRYA.—A genus of low, smooth or hairy herbs, with perennial roots, and linear or spoon-shaped, entire or sinuate-toothed leaves. Flowers white, rose, or purple, with erect sepals, and clawed spoon-shaped petals.

Culture and Propagation.—Parryas are suitable for the rockery or edge of borders. They grow easily in ordinary garden soil and may be increased by dividing the roots in early autumn or spring. Seeds may also be sown as soon as ripe in the open border, and the seedlings should be transplanted not later than the end of September, so that the roots may obtain a good hold of the soil before winter.

P. arabidiflora. — A Siberian plant 6 in. high with somewhat fleshy lance-shaped leaves and purple flowers in May.

Culture &c. as above.

P. arctica. — A native of Arctic America about 3 in. high, with almost entire leaves and corymbs of pale purple flowers in May and June.

Culture &c. as above.

P. integerrima.—A Siberian plant 6 in. high, with entire, somewhat spoon-shaped leaves, and beautiful purple flowers in April and May.

Culture &c. as above.

P. nudicaulis. — A pretty little rock plant from the Arctic regions. Leaves elliptic oblong, acute, entire or toothed, 2–3 in. long. Flowers in April and May, 1 in. across, with obcordate petals.

Culture &c. as above.

CHEIRANTHUS (Wallflower).— A genus of biennial or perennial herbs or undershrubs with oblong or linear, entire or toothed leaves. Flowers rather large, racemose, without bracts, yellow or purple, having erect sepals, the latter ones saccate at the base, and long-clawed petals. The long seed pods are more or less 4-angled, or winged, or compressed.

C. asper (*C. capitatus*).—A somewhat tender Californian species with linear lance-shaped more or less toothed or entire leaves, tapering towards the base and covered with close-pressed hairs. The rather large yellow flowers appear in dense corymbs in June.

Culture and Propagation. — This species requires a rich loamy soil and warm sheltered positions. It may be increased in summer by cuttings of the young and non-flowering side-shoots, which should be put under a hand glass and kept in a cold frame or greenhouse during the winter. Seeds may also be sown when ripe in cold frames, and the seedlings are safer protected in severe winters. In spring they may be planted out.

C. Cheiri (*Common Wallflower*). — A well-known sub-shrubby plant distributed over Central and N. Europe, and reaching a height of 1 or 2 ft. The smooth or slightly hairy leaves are 2–3 in. long, lance-shaped, quite entire, on more or less angled stems. The fragrant flowers are about 1 in. across, and orange-yellow in a wild state, but various shades of red, purple or brown in cultivated forms.

The Wallflower is a beautiful old garden plant, and gives a peculiar charm to old walls, ruins, and semi-wild places, on which it grows freely, and looks far more picturesque than when grown in rows like Carrots or Turnips.

There are many kinds grown and all are very beautiful. Among the single-flowered kinds may be mentioned the 'Blood-red,' 'Harbinger,' 'Belvoir Castle' 'Golden Tom Thumb,' 'Ruby Gem,' 'Eastern Queen' &c. The double varieties are also beautiful, with many shades of yellow, pale and dull brown.

Culture and Propagation.—The seeds of Wallflowers are usually sown too late in the year, the consequence often being that the plants are not sufficiently hardy to withstand a severe winter, especially when hard frosts succeed cold rains. Imported seeds of both single and double kinds are usually better than any saved in the British Islands, as our capricious seasons often interfere with the proper ripening of seeds.

From March to the end of May is the best time for sowing so as to obtain a succession of bloom. The seedlings should always be transplanted to check the tap-root and cause the development of fibrous roots near the surface. By May or June the plants should be in their permanent quarters to give a splendid display of bloom from Christmas to March.

The common custom among cottagers of filling gardens in spring with plants already almost in bloom is not to be recommended, as the plants are too far advanced to do any good, and very often are little better than scarecrows. If spring planting is adopted, it should be done as early as possible in mild open weather, so that the plants will make a brave show until the time for summer bedding out commences, that is, any time from the end of May to the end of June, according to season and locality.

C. Marshalli. — This is a supposed hybrid Wallflower 12–18 in. high, having the lower leaves more or less spoon-shaped, and the upper ones lance-shaped. The deep clear orange-yellow flowers about 1 in. across are freely produced in spring.

Culture and Propagation. — Sometimes this Wallflower does not seed freely, and it must then be increased by means of cuttings of the young shoots inserted in light sandy soil in spring and summer under glass, or in cold frames, much in the same way as recommended for *C. asper*.

C. Menziesi. — A Californian plant 6–8 in. high, somewhat tender, with oblong lance-shaped downy leaves 2–4 in. long, and bright purple flowers.

Culture and Propagation.—Requires the same treatment as *C. asper* above.

C. mutabilis. — A tender shrubby species 2-3 ft. high, native of Madeira. Leaves somewhat downy, linear lance-shaped, finely toothed. Flowers appear in early spring, cream-coloured at first, becoming purple or striped with age.

Culture &c. the same as *C. asper* above.

C. scoparius.—A half-hardy shrubby species from Teneriffe, 2-3 ft. high, linear lance-shaped entire and somewhat downy pointed leaves. The flowers appear in May, at first white, changing to purple.

Culture &c. the same as for *C. asper* above.

C. semperflorens. — A half-hardy shrubby plant 1-2 ft. high, from Morocco. The entire roughish leaves are linear lance-shaped and the yellow and white flowers appear at various seasons.

Culture and Propagation.—The perennial Wallflowers must be kept dry in winter and in sheltered places. They may be increased from cuttings taken in August or September, and during those months inserted in a shady place or in boxes of sandy soil. Also by seeds as for *C. asper.*

BARBAREA (Winter or American Cress).—A genus consisting of about 20 species of smooth, fibrous-rooted biennials or perennials, with angled stems. Flowers yellow on erect terminal racemes, sometimes with bracts.

Culture and Propagation. — These plants grow in any soil, and are readily increased by cuttings, suckers, seeds, or division of the roots. The variety mentioned below having double flowers rarely or never produces seeds. It must therefore be increased by dividing the roots in early autumn or in spring, or by inserting cuttings of the side and basal shoots in sandy soil in a cold frame, or a shady border in the summer.

B. vulgaris flore pleno (*Double Yellow Rocket*).—This is the only variety worth growing on account of its bright yellow double flowers which appear from June till the autumn. The lower leaves are cut like those of a Dandelion, the upper ones being obovate, toothed or pinnatifid.

There is a form with yellowish variegated foliage, which may be reproduced from seeds, or by the other methods mentioned above. It makes a good edging plant, and is also suitable for the rockery.

B. præcox, a British plant, is sometimes grown as a salad, the lower leaves being used in the same way as Water Cress and also for seasoning and garnishing.

ARABIS (Wall Cress; Rock Cress).—A genus of 60 or more species of smooth or hairy annual or perennial herbs, the lower leaves of which are stalked and spoon-shaped, the upper ones stalkless, entire or toothed, rarely lobed. Flowers mostly white, rarely purple or rose.

Culture and Propagation. — These plants grow in dry spots, and are very suitable for the rockery or mixed border, where their masses of snowy white flowers render them conspicuous in spring. They are increased from seeds sown in the open border in April and May, or as soon as ripe. The seedlings are pricked out when large enough, and may be transferred to the places where they are to flower either about the end of September or in spring. Seedlings often come up spontaneously where a plant is flourishing. Cuttings of the perennial species placed in a shady border in summer will also root freely, and the young plants thus raised may be transplanted in autumn. As soon as flowering is over the plants may also be divided and replanted in good garden soil, care being taken to water the plants well after moving.

The following are some of the best kinds for the flower garden, but there are several others met with occasionally in botanical collections.

A. albida (*A. caucasica*).—A plant 6-9 in. high, native of Tauria and the Caucasus. Leaves few, toothed, hoary or downy, the lower ones obovate oblong, the upper ones cordately sagittate clasping the stem. The white flowers appear in masses from January to May. The variety *variegata* has variegated leaves, and is much used for edgings.

Culture &c. as above.

A. alpina.—A European plant 6 in. high, with many-toothed lance-shaped acute hairy leaves, the lower ones stalked, the upper heart-shaped, stem-clasping. Flowers white, March to May. A double-flowered form has recently appeared. It has no stamens or pistil, but the petals are 12 instead of 4 in number. There is a variegated form having leaves bordered with yellowish-white, that render it attractive as an edging plant.

Culture &c. as above.

A. androsacea. — A pretty, dense-growing species, about 2 in. high, from Mt. Taurus in Asia Minor, at an elevation of 7000 or 8000 ft. The lower leaves are linear-oblong or lanceolate obtuse in compact rosettes; the upper ones stalkless, linear or linear-ovate, slightly toothed. Flowers in summer, white with ovate petals.

Culture &c. as above for *A. albida.*

A. arenosa. — A native of Central Europe, 6 in. high, with branched hairy stems. Leaves hairy, the lower ones pinnatifid, the upper ones deeply toothed. Flowers from April to July, rose, rarely white or purple, slightly fragrant.

Culture and Propagation.—This species being a biennial or annual is best raised from seeds annually. They should be sown as soon as ripe out of doors, or in bleak parts of the country in cold frames. The seedlings are pricked out in light soil about 1 ft. apart each way, about the end of September. If wintered in frames the plants should have plenty of light and air on all possible occasions, and may be planted out at the first favourable opportunity in spring.

A. blepharophylla. — A Californian species 3–4 in. high, with lower leaves spoon-shaped, upper ones oblong, sessile, all being edged with stiff hairs. Flowers rosy-purple, varying a good deal.

Culture &c. as for *A. albida.* Best raised from seeds annually, as it is often killed in winter.

A. lucida.—A pretty rock plant native of Hungary, 4–6 in. high, with shining, obovate, thickish leaves, clasping the stem. The white flowers appear in summer.

The variety *variegata* is a superior plant with light green yellow-edged leaves. It is a very beautiful rock plant and is very effective in bold masses in rocks or crevices. The flowers detract from the appearance of the foliage, and should be picked off.

Culture &c. as for *A. albida.*

A. mollis.—A native of the Caucasus, 2 ft. high, with large-toothed somewhat downy leaves, the lower ones roundly heart-shaped, on long stalks, the upper ones oval, heart-shaped and stem-clasping. The white flowers appear in terminal racemes from May to July.

Culture &c. as for *A. albida.*

A. petræa.—A British plant 3–4 in. high, with smooth ciliated or rough leaves, the lower ones simple or bifid on long stalks entire toothed, the upper ones oblong linear. Flowers white or purplish with spreading broadly-clawed petals, appearing from June to August.

Culture &c. as for *A. albida.*

A. præcox.—A Hungarian plant 6-9 in. high, with smooth, entire, oblong acute and stalkless leaves. The white flowers with obovate wedge-shaped petals appear from April to June.

Culture &c. as for *A. albida.*

A. procurrens.—A native of Servia, about 9 in. high, with creeping stems. Leaves ovate, entire, smooth, with hairy edges, the lower ones narrowed into a stalk, the upper ones stalkless and pointed. In May and June the white flowers with obovate petals appear. The variegated form of this species is a very pretty rock-plant or for edgings.

Culture &c. as for *A. albida.*

A. rosea.—A native of Calabria, 12 in. high. The upper leaves are oblong, somewhat heart-shaped, more or less stem-clasping, scabrous with branched hairs. The rosy-purple flowers with oblong wedge-shaped petals are produced from May to July.

Culture &c. as for *A. albida.*

A. verna.—A pretty annual 3–6 in. high, from S. Europe. The upper leaves are heart-shaped, stem-clasping, toothed and roughish with 3-parted hairs. Flowers in May and June, small, purple, with clawed petals.

Culture &c. as above for *A. arenosa.*

STREPTANTHUS.—A little known genus containing about 20 species of smooth annual or perennial herbs, having entire leaves, or the lower ones lyrate pinnatifid, the upper ones stalkless or stem-clasping. Flowers purple, rarely white or yellow, rarely with bracts, sometimes drooping. Of the 4 sepals, 2 or all are saccate at the base, often coloured, sometimes very broad. Petals having a straight or twisted claw.

Culture and Propagation.—The two species described below are annuals, and may be raised from seeds sown about March or April out of doors, or earlier on a hotbed like other annuals (see p. 78). They may also be sown in autumn as soon as ripe, and in cold parts of the kingdom protected in a cold frame during the winter months.

S. hyacinthoides.—A simple stemmed or branching plant 2-3 ft. high, from N.W. America, having unstalked clasping, oblong-linear pointed leaves. The deep bluish-purple flowers appear in autumn, having lance-shaped pointed sepals, and spoon-shaped linear petals, with a reflexed limb.
Culture &c. as above.

S. maculatus.—A native of the same region as the preceding, and 18 in. or more high. Leaves oval oblong, 3-6 in. long, glaucous, somewhat acute, the upper ones having long and blunt lobes clasping the stem. The showy deep velvety purple flowers, with purplish sepals, appear late in summer, the stalklets of each flower being 3-4 in. long.
Culture &c. as above.

CARDAMINE (Lady's Smock; Cuckoo-Flower). — A genus of some 60 species of smooth herbs varying a good deal in habit, and not much cultivated. The leaves are stalked, entire, lobed or pinnately cut, differing greatly on the same plant.
Culture and Propagation. — These plants thrive in damp shady situations in any soil, and are easily increased by dividing the roots after flowering, and also by sowing the seeds in the open border as soon as ripe. They may be used in borders, rockeries, banks &c. The following are a few of the best kinds :—

C. asarifolia.—A native of S. France and N. Italy, 12-18 in. high, with smooth, stalked, roundish heart-shaped leaves, somewhat sinuately toothed. Flowers in early summer, in close racemes, white.
Culture &c. as above.

C. pratensis (*Cuckoo Flower*).—This is perhaps one of the most common wild flowers of our damp meadows, its pale purple or white flowers appearing early in spring. It is too common to need cultivation in the flower garden proper, but its double-flowered variety (*flore pleno*) is worth growing in the border.
Culture &c. as above. As the double variety does not usually produce any seeds it must of necessity be increased by division in spring. Cuttings of the shoots may also be rooted in light rich soil in a shaded part of the border during the summer months.

C. rhomboidea. — A tuberous species from the United States; the lowest leaves are round, and rather heart-shaped, passing upwards into ovate or rhomboid-oblong, and almost lance-shaped, all somewhat angled and sparingly toothed. Flowers large, white, appearing in spring. The variety *purpurea* has rosy-purple flowers appearing earlier than those of the type.
Culture &c. as above.

C. rotundifolia. — A plant found wild on the mountains of Pennsylvania, about 6 in. high, with procumbent stems. Leaves smooth, roundish, slightly toothed, stalked. Flowers in early summer, white small, in a terminal raceme.
Culture &c. as above.

C. trifolia.—A dwarf plant 3-6 in. high, with creeping runners, native of the mountains of Central Europe. Leaves smooth, ternate, with rhomboid-roundish toothed leaflets. Flowers in spring, white, in a terminal cluster.
Culture &c. as above.

LEAVENWORTHIA. — A small genus of dwarf and pretty annuals with lyrate-pinnatifid leaves, and flowers either solitary on scapes or in loose racemes.

L. Michauxii. — A native of the United States, 3 in. high, with leaves in tufts, and rosy-lilac flowers with a yellow eye, produced in June. *L. aurea* is a yellow-flowered variety worth growing.
Culture and Propagation. — This species may be treated as a half-hardy annual, being raised from seeds in the usual way in gentle heat in spring, afterwards transferring the young plants to the open ground at the end of May or beginning of June.

LUNARIA (Honesty; Peter's Pence).—A genus containing 2 species of annual, biennial or perennial herbs, with stalked, entire, heart-shaped leaves and rather large flowers in erect terminal racemes.

L. annua (*L. biennis*).—This charming plant is well known in gardens. It is a native of N. Europe, and about 2-3 ft. high, with deep green heart-shaped and irregularly toothed leaves, and racemes of beautiful scentless violet-lilac flowers produced from May to July. There are several varieties, chiefly differing in the colour of the flowers—white, and various shades of purple. The great charm of the plant, however, lies in its large flat elliptic silvery seed pods, like opaque spectacles, which are borne in such profusion, and so much used for room decoration during the autumn and winter months.

There is a variegated form in which the leaves are broadly edged with whitish or creamy yellow.

Culture and Propagation.—Honesty should be raised from seeds sown in the open border every spring, and the seedlings may be either thinned out or transplanted early in autumn or preferably in spring to their flowering quarters for the following season. A good sandy loam suits them best, but any rich garden soil will produce fine specimens. The plants should not be nearer than about 18 in. to each other, and if the leading shoot is pinched out, fine bushy plants and plenty of blossom will be obtained by the development of the side shoots. As the young and tender shoots are greedily devoured by slugs, a watch must be kept on these marauders. A dusting of lime and soot early in the morning while the dew is still on the ground will keep them at bay.

L. rediviva is a vigorous, hairy, branching perennial species 2–3 ft. high, with large, heart-shaped, deeply toothed leaves on long stalks, and racemes of purplish fragrant flowers produced in early summer. The fruits or seed pods are smaller than those of the Common Honesty and also less rounded, but they may be similarly used.

Culture &c. as above. Although not so well-known as its biennial relative, this perennial species, which is a native of the Alps, is ornamental in the rockery or flower border if grown in masses for effect. It prefers a good sandy soil and a somewhat shaded position facing north or north-west. Seeds may be sown as recommended above for *L. annua*, but the established plants may also be divided at the root either about September or in spring when growth is about to commence. Cuttings of the non-flowering side and basal shoots may also be rooted during the summer months in a shady border or in a cold frame.

SELENIA.—A genus of 2 species of small and not well-known annual herbs, with pinnatisect leaves, and terminal leafy racemes of yellowish flowers. Sepals spreading, coloured, sub-equal. Petals erect. Glands 10, hypogynous.

S. aurea. — A native of the United States, with linear oblong pinnatifid leaves 1–2 in. long, having 5–7 pairs of segments. The golden-yellow scented flowers, with greenish yellow sepals, appear about June, and last a long time.

Culture and Propagation. — This pretty annual grows about 9 in. high and may be raised from seeds sown in early spring in gentle heat, or out of doors in April and May. The seedlings may be either pricked out in mild weather or thinned out 6–9 in. apart in ordinary good garden soil.

FARSETIA.—A genus of about 20 species of hardy or half-hardy branched erect herbs or undershrubs, more or less hoary or downy, with entire alternate leaves, and racemose or spiked flowers, sometimes minute, white, yellow or purple. Sepals often erect, the lateral ones saccate at the base. Petals clawed.

Culture and Propagation.—Most of the Farsetias are pretty, and will grow in ordinary garden soil. They are good plants for rockeries, borders &c., and are easily increased by seeds sown in spring in gentle heat, or as soon as ripe in cold frames. The seedlings may be pricked out as soon as large enough to handle easily, and afterwards transferred to the open border about the end of May or beginning of June.

F. ægyptiaca. — A somewhat tender much-branched shrub 1 ft. high, from N. Africa, with linear hoary leaves, and white flowers in July.

Culture &c. as above. Grows best in sandy loam and peat in sheltered spots.

F. clypeata.—A native of S. Europe, 1–2 ft. high, with oblong spreading leaves, and yellow flowers in June.

Culture &c. as above.

F. lunarioides.—A sub-shrubby species about 1 ft. high, from the Greek Archipelago. Leaves oblong-obovate, stalked, hoary. Flowers in June, yellow, with whitish sepals.

Culture &c. as above.

AUBRIETIA (Purple Rock Cress). A small genus of evergreen, more or less tufted, downy or hoary perennials, with entire or angularly toothed leaves, and few flowered racemes.

Aubrietias are charming plants for the rockery, where they make dense carpets of sage-green leaves and purple flowers. They may also be used for edgings to borders, shrubberies &c.

Culture and Propagation.—Aubrietias thrive in a deep rich loam, and are easily propagated by seeds sown in spring either in gentle heat about March or in the open border about April and May. The seedlings are pricked out into light soil, and about the end of September may be transferred to their permanent positions.

Cuttings may also be rooted during the summer months in light sandy soil in partially shaded borders, and the plants thus obtained may be transplanted as in the case of seedlings. Aubrietias may also be increased by layering the long slender branches after flowering, covering them with sandy leaf soil; and dividing the plants in autumn is likewise an easy and certain method of increasing the stock.

A. deltoidea.—A native of the mountains of S. Europe, 2–4 in. high, having roughish rhomboidal leaves covered with very short stellate hairs. The lilac-purple flowers are produced in great profusion in early spring, and almost hide the foliage. The petals are twice as long as the sepals, and have long claws. There is a charming variegated form in which the leaves are conspicuously edged with yellowish-white. It is elegant for rockeries and border edgings, and as it does not seed freely, is best increased by means of cuttings, layers or division as stated above.

The following are really only botanical varieties of *A. deltoidea*, but they are more or less distinct, and considered as species by some authorities; and to them may be added the forms known as *Columnæ*, *Leichtlini*, and *Mooreana*, all with deep shades of purple.

A. Bougainvillei is very dwarf and compact in habit, having light violet-purple flowers with very even imbricating petals.

Culture &c. as above.

A. Campbelli (*A. Hendersoni*).—This is a vigorous-growing form with larger deep violet-blue flowers than *A. deltoidea*. The variety *grandiflora* with a loose habit is very near this, and looks very pretty in masses.

Culture &c. as above.

A. Eyrei. — A very fine variety with large rich deep violet-purple flowers, and a free branching habit. *A. olympica* is closely related, if not actually the same as this.

Culture &c. as above.

A. græca.—A strong-growing variety from Greece, about 4 in. high, and with a neat compact habit. The flowers, which are probably larger than those of any other variety, are a beautiful shade of pale purple. *Superba* is a form with rather deeper coloured flowers.

Culture &c. as above.

A. purpurea. — This has broader leaves, larger purple flowers—which also appear later—a more erect habit and more leafy stems than *A. deltoidea*. The variegated form is useful for carpet-bedding and as an edging to small beds &c. *Dr. Murie* is a beautiful garden form of *A. purpurea*.

Culture &c. as above.

A. violacea.—This is a very fine variety with large deep violet-purple flowers fading to reddish-violet, and has a very effective appearance.

Culture &c. as above.

VESICARIA (Bladder Pod).—This genus contains about 20 species of branched annual or perennial herbs, with entire, sinuate or pinnatifid leaves, and large, rarely small, yellow or purple flowers, varying in form. Fruit pods globose or inflated.

Culture and Propagation.—Vesicarias grow readily in ordinary soil, and are suitable for sunny parts of rock-work. The annual and perennial species are reproduced from seed which is produced freely in favourable seasons, and may be sown in cold frames either as soon as ripe, or in gentle heat in spring. The seedlings are pricked out into light rich soil when large enough, and by the end of May or beginning of June will be ready for transplanting to the border or rockery as required. To secure good effects, several plants should be grouped together about 9–12 in. apart. The perennial kinds may also be increased from cuttings put under a hand-glass or in a cold frame during the summer or autumn months.

V. arctica.—A perennial about 1 ft. high, from N. America. Leaves in clusters, oblanceolate and linear spoon-shaped, of a beautiful silvery colour. Flowers in August, yellow, in dense racemes.

Culture &c. as above. Increased by seeds or cuttings.

V. gracilis.—An annual species, 6 in. high, native of Texas. The thread-like rigid and slightly rough stems have lance-shaped entire or slightly angled leaves, the lower ones stalked, more or less spoon-shaped. Flowers in June, yellow, with spreading obcordate and nearly sessile petals.

Culture &c. as above. Increased by seeds.

V. græca (*Alyssum utriculatum*).—A perennial plant from Greece. Leaves of the sterile branches thick, oblong, spoon-shaped, slightly acute; those of the fertile stems stalkless, erect, acute, with hairy and often slightly toothed margins. Flowers in summer, yellow.

Culture &c. as above. Increased by seeds and cuttings.

V. grandiflora.—A downy annual from Texas, 1 ft. high, with erect flexuose stems. Lower leaves stalked, more or less lyrately pinnatifid, the upper ones stalkless, sinuate-toothed. Flowers in July, large, yellow, with rounded spreading shortly clawed petals.

Culture &c. as above. Increased by seeds.

V. utriculata.—A perennial from S. Europe, 1 ft. high, having oblong, entire, smooth leaves, the lower ones with hairy edges and somewhat spoon-shaped. Flowers from April to June, yellow, closely resembling those of the Wallflower; calyx bisaccate at the base.

Culture &c. as above. Increased by seeds and cuttings.

ALYSSUM (Madwort). — A genus containing about 80 or 90 species of annuals or dwarf branching shrubby perennials often covered with hoary stellate hairs. Leaves sparse, or tufted at the base, entire, often linear. Racemes without bracts. Flowers white or yellow, often inconspicuous.

Culture and Propagation.—The Madworts are most effective as rock plants or in front of other plants in the mixed border. They grow freely in ordinary well-drained soil, and are increased by cuttings during the summer months in a shaded border; division of the roots in autumn or spring; or by seed sown out of doors in April and May, or indoors in gentle heat earlier in spring. The seedlings are pricked off and are usually ready for transplanting to their permanent positions about September or spring.

The following are some of the kinds most frequently met with:—

A. alpestre. — A pretty greyish-looking perennial 8 in. or more high, from South Europe, with ovate hoary leaves, and simple racemes of yellow flowers in June. A good plant for chinks of old walls. The variety *obtusifolium* is somewhat rare, with bluntly obovate spoon-shaped leaves, silvery beneath.

Culture &c. as above.

A. atlanticum.—A native of S. Europe 6–12 in. high, with lance-shaped, hoary and hairy leaves, and yellow flowers in June.

Culture &c. as above.

A. gemonense. — A desirable Italian species about 1 ft. high, with lanceolate, entire, greyish velvety leaves, and yellow flowers produced in close corymbs from April to June.

Culture &c. as above.

A. macrocarpum. — A native of S. France, less than 1 ft. high, with oblong, blunt silvery leaves, and racemes of white flowers in June.

Culture &c. as above.

A. maritimum (*Sweet Alyssum*).—A pretty British and European species 4–10 in. high with linear lance-shaped downy leaves 1–1½ in. long and racemes of small white sweet-scented flowers produced from June to September. The variety *compactum* is a closer growing plant forming rounded tufts, and continues to flower during the summer and autumn months. There is also a variegated variety with yellowish-white bordered leaves. This rarely seeds, and in any case is best increased by cuttings or division.

Culture &c. as above. Although in reality a perennial, the Sweet Alyssum is frequently treated as an annual. Seeds may be sown in either autumn or spring, and the seedlings are transplanted about the end of May, or in autumn, according to the season at which the seeds were sown.

A. montanum. — A spreading tufted perennial 2–4 in. high, native of the Alps and Pyrenees. Leaves somewhat hoary, rough with stellate hairs, lower ones obovate, upper ones oblong. Flowers from May to July, yellow, sweet-scented.

Culture &c. as above.

A. olympicum.—A native of N. Greece 2–3 in. high, with small, greyish, spoon-shaped leaves without stalks. Flowers in summer, small, deep yellow, in roundish corymbose heads.

Culture &c. as above.

A. orientale.—A native of Crete, 1 ft. high, with lance-shaped, repandly-toothed waved and downy leaves. Flowers in May, in corymbose clusters.

Culture &c. as above.

A. podolicum.—A small alpine from South Russia, with a profusion of small white flowers in early summer.

Culture &c. as above.

A. pyrenaicum. — A tufted Pyrenean species 8–10 in. high, with roundish leaves woolly on the under surface. The white flowers appear from June to August, and are noticeable for the brownish anthers in the centre.

Culture &c. as above.

A. saxatile. — A well-known and beautiful species about 1 ft. high, from E. Europe, somewhat shrubby at the base. Leaves lance-shaped, entire, hoary. Flowers in April and May, bright yellow, freely produced, in loose panicles. The variety called *compactum*, which comes true from seeds, is particularly useful for rockeries and edgings on account of its dwarf bushy character. The variety *variegatum*, with yellowish-white leaves, is a pretty form, and does well in a sunny place in the rockery.

Culture &c. as above. The variegated form is best increased by means of cuttings.

A. serpyllifolium.—Also from South Europe, 3–4 in. high, somewhat woody at the base. Leaves ¼–½ in. long, ovate, rough and hoary. Flowers from April to June, pale yellow, in simple racemes.

Culture &c. as above.

A. spinosum.—A native of S. Europe 4–8 in. high, resembling *A. macrocarpum*. Leaves lance-shaped, small and hoary, the branches being spiny when old. Flowers in early summer, small, white, in clusters at the ends of the branches.

Culture &c. as above.

A. tortuosum.—A Hungarian species, 6 in. high, shrubby at the base, twisted, with rather lance-shaped, hoary leaves, and corymbose racemes of yellow flowers in June.

Culture &c. as above.

A. Wiersbeckii. — A native of Asia Minor, about 18 in. high, with roughish erect stems. Leaves 2 in. long, oval, oblong, acute, without stalks, narrowed at the base, and covered with rough prominences and fine hairs. Flowers in summer, deep yellow, about 1½ in. across, in large corymbose heads.

Culture &c. as above.

A. wulfenianum. — A dwarf alpine Crucifer, native of Eastern Europe. The decumbent or trailing stems are 1–3 in. long, and the small oblanceolate leaves are covered with down. The golden-yellow flowers appear in summer in small compact corymbs.

Culture &c. as above.

DRABA (WHITLOW GRASS).—A genus containing, according to various authors, from 80 to 150 species consisting chiefly of very small, tufted, and hoary alpine plants, with entire leaves, the lower ones in rosettes. Racemes short or elongated. Flowers without bracts, often small, white or yellow, rarely purple or rose.

The Drabas are essentially rock plants, owing to their compact habit and to their love for sunny spots. For filling up nooks and crevices, on the top of old walls, ledges, copings &c., they are very useful, their cushions of leaves, thickly studded with white or yellow flowers, being at once effective and beautiful.

Culture and Propagation. — They grow easily in ordinary soil, and the perennial sorts may be increased by dividing the roots in early autumn. The annual and biennial species and also the perennials may be raised from seed sown in spring in the open border. If sown late in summer, annual kinds will flower the following year.

D. aizoides.—A brilliant species 2–3 in. high, native of S. Wales and Central Europe. Leaves narrow, lance-shaped, keeled, hairy at the edges, and arranged in neat rosettes. Flowers in March, bright yellow, in terminal racemes. The variety *dedeana* from Spain is a pretty plant with white flowers. It is sometimes regarded as a distinct species.

Culture &c. as above. Increased by seeds and division. This makes fine cushions for the rock garden, and is a valuable early-flowering alpine plant.

D. Aizoon (*D. ciliaris*).—A somewhat vigorous species, 3 in. high, from the mountains of W. Europe. Leaves linear, acute, keeled, hairy-edged. Flowers in April, bright yellow, on naked hairy scapes. It ripens seed freely.
Culture &c. as above. Increased by seeds and division.

D. alpina.—A native of N. Europe, 3 inches high, with flat lance-shaped hairy leaves, and naked downy scapes of golden-yellow flowers produced in April.
Culture &c. as above. Increased by seeds and division.

D. aurea.—A biennial species from Greenland, about 6 in. high, with somewhat branched velvety stems, and oblong-linear, acute, entire, downy leaves. Flowers in May, with obovate, blunt, clawed petals.
Culture &c. as above. Increased by seeds.

D. bruniæfolia.—A loosely tufted plant, about 4 in. high, from the Caucasus. Leaves linear, somewhat keeled, acute, in loose rosettes. Flowers in June, yellow, on naked downy scapes.
Culture &c. as above. Increased by seeds and division.

D. ciliata. — A fine white-flowered species 2 in. high, from Croatia and Carniola, and very much like a miniature plant of *Arabis albida.* Leaves rather leathery, smooth, with a cartilaginous margin slightly toothed and fringed with stiff hairs. Flowers in early summer, white, few, closely set.
Culture &c. as above. Increased by seed and division.

D. cinerea.—A Siberian biennial 3-6 in. high, with somewhat downy stems, Leaves oblong-linear, entire, scattered. Flowers in early spring, white.
Culture &c. as above. Increased by seeds.

D. cuspidata.—A native of Tauria, 3 in. high, nearly related to *D. Aizoon*, and probably only a form of it. Leaves in dense rosettes, linear, acute, keeled, hairy-edged. Flowers in spring, yellow, in terminal racemes; scapes naked, hairy.
Culture &c. as above. Increased by seed and division.

D. glacialis. — This is a native of Siberia and the granitic Alps of Switzerland, about 2 in. high and like a small form of *D. aizoides.* Leaves linear and lance-shaped, entire, with stellate hairs. Flowers in May, bright golden-yellow; scapes naked, with a starry down.
Culture &c. as above. Increased by seeds and division.

D. lapponica.—A native of the Lapland Alps, 2-3 in. high, with lance-shaped, entire, rather hairy leaves. Flowers in May, white; scapes naked, very smooth.
Culture &c. as above. Increased by seeds and division.

D. Mawi.—A lovely rock plant with masses of bright green densely tufted foliage. It is a native of Spain. Leaves linear-oblong, blunt, shiny, margin pectinate, with stiffish incurved or spreading bristles. Flowers in spring, white, ¾ in. across; sepals deeply concave, bristled behind, green tipped with red-brown.
Culture &c. as above. Increased by seeds and division.

D. nivalis.—A native of Arctic Europe 1-2 in. high, more compact in habit than *D. lapponica.* Leaves linear-oblong, rather hairy, with fringed edges. Flowers in April, white; scape naked or one-leaved, smooth.
Culture &c. as above. Increased by seeds and division.

D. pyrenaica (*Petrocallis pyrenaica*). A beautiful Alpine 2-3 in. high, native of the mountains of S. Europe. Leaves wedge-shaped, palmately 3-lobed; stems shrubby at the base dividing into many small branches. Flowers in April and May, at first white, pale lilac-purple, then faintly veined, sweet-scented, borne in short few-flowered racemes.
Culture &c. as above. Increased by seeds and division.

D. rupestris. — A compact-growing species 2-3 in. high, native of Norway, Scotland, and North America. Leaves crowded, lance-shaped, almost entire, hairy. Flowers in summer, white, few, small, on almost leafless stems.
Culture &c. as above. Increased by seeds and division.

D. Sauteri.—A Swiss plant 4 in. high, with stiff spoon-shaped leaves, fringed with hairs. Flowers in spring, yellow; scapes smooth.

Culture &c. as above. Increased by seeds and division.

D. tridentata.—A native of the Caucasus readily recognised by its 3-toothed hairy obovate leaves, narrowed at the base into a stalk. Flowers in spring, golden-yellow, in terminal racemes; scapes naked, smooth. This species is also known as *D. hispida*, on account of its hairy leaves.

Culture &c. as above. Increased by seeds and division.

D. violacea.—A native of the Andes of Quito, 6–12 in. high, with branching sub-shrubby stems, and opposite ovate downy leaves. Flowers deep violet-purple.

Culture &c. as above. Increased by seeds and division.

SCHIZOPETALON.—A genus consisting of 5 species of pretty-looking erect slightly branched annual hoary herbs with alternate, sinuate-toothed or pinnatifid leaves. Racemes terminal, with leafy bracts. Flowers purple or white. Sepals erect, nearly equal at the base. Petals clawed, pinnately lobed.

S. Walkeri. — A curious half-hardy annual, 1–2 ft. high, native of Chili. The whole plant is covered with a branched down, and has alternate, sinuately pinnatifid leaves, the upper ones near the flowers being more or less linear and entire. Flowers from May to August, white, almond-scented, fringed, and borne in long racemes, each pedicel having a linear bract. The prettily cut petals are often suffused with violet or purple beneath.

Culture and Propagation.—The seeds of this plant should be sown in the open in April or May in light, warm rich soil, and the seedlings should be left to flower during the summer and autumn where sown, as they do not transplant well. Cold damp shady spots should be avoided for growing this interesting plant; and to obtain a good effect, the seeds should be sown in fairly large patches, as thinly as possible. If the plants are too thick they must be thinned out.

HESPERIS (DAME'S VIOLET; ROCKET).—This genus contains about 20 species of ornamental biennial or perennial erect hairy herbs with ovate or oblong, entire, toothed or lyrate leaves. Flowers rather large, in loose bractless racemes, often variously coloured, sometimes fragrant. Sepals erect, lateral ones gibbous at the base. Petals clawed.

Culture and Propagation. — The Rockets thrive in a somewhat damp sandy loam, and are easily reproduced from seeds. These are sown in April and May out of doors in light sandy soil, or earlier in the year under glass in gentle heat. The seedlings are pricked out when large enough to handle easily, and may be moved later on in autumn to their flowering positions. The seeds may also be sown as soon as ripe in cold frames, and kept protected during the winter months, and the seedlings may be placed out of doors at the end of May.

The plants may also be divided in spring, but as this would to a certain extent interfere with early flowering, the plants are on the whole better divided any time during August and September. They should afterwards receive a good soaking with water to settle the soil and prevent the plants 'flagging' or wilting too much.

H. grandiflora. — The origin of this plant is unknown. The lower leaves are oblong-ovate, blunt, the upper ones lance-shaped. The purplish flowers appear in summer in many-flowered crowded racemes.

H. matronalis (*Dame's Violet* or *Rocket; Damask Violet; Common Rocket*).—This pretty old garden plant grows wild from S. Europe to Russian Asia, and is 2–3 ft. high. Leaves 2–5 in. long, shortly stalked or tapering at the base, more or less ovate-lance-shaped, finely and irregularly toothed or serrate. Flowers from May to July, ¾ in. across, white or lilac, scented in the evening.

The double white and purple-flowered kinds (*flore pleno*) are much more highly valued as garden plants, not only for their pretty flowers, but also for their delicious fragrance.

Culture &c. as above. The seeds of this plant may be sown in the chinks or crevices of old walls, ruins &c., where it seems to be more at home than anywhere else. The double forms of the Dame's Violet (*H. matronalis*), however, are more easily increased by carefully dividing the roots, at least every alternate year, or from cuttings of the young shoots inserted in the open ground in a shady place.

At one time the double varieties were more extensively grown than they are at the present day.

H. violacea. — A pretty biennial or perennial species 1–2 ft. high, native of Asia Minor, with tufts of oblong downy or hairy leaves irregularly toothed on the margins. The bright purple or violet flowers, with deeper coloured veins, are produced from April to June in large trusses well above the foliage, and are highly effective and ornamental in the border or rockery.

Culture &c. as above. This species, although really a perennial, is usually raised from seeds sown in autumn or spring.

MALCOLMIA.—A genus of about 20 species of beautiful branching and often prostrate hairy herbs, having alternate, entire, or pinnatifid leaves. Flowers in loose racemes, bractless, white or purple.

Culture and Propagation.—The Malcolmias grow easily in ordinary good garden soil, and may be raised from seeds sown thinly from spring till autumn, to obtain a succession of bloom. The general treatment is the same as recommended above for the Dame's Violet (*Hesperis*).

M. chia.—A branching plant 6–12 in. high, native of Chio. Leaves downy beneath, entire or rarely toothed, lower ones obovate or spoon-shaped, upper ones narrower and more acute. Flowers in June, purplish-lilac.

Culture &c. as above.

M. littorea. — A native of the Mediterranean region 6–12 in. high, with lance-shaped linear, nearly entire, hoary leaves. Flowers from June to November, bright pink-purple, the large delicate petals not being veined. Seed pods hoary.

Culture &c. as above.

M. maritima. — This pretty annual is commonly known as the 'Virginian Stock.' It is 6–12 in. high, native of Europe, having erect branching stems, and elliptic, blunt, entire leaves, narrowed at the base. Flowers from spring to autumn, lilac, rose, red or white, fragrant.

Among the many varieties may be mentioned *alba*, white; *alba nana*, also white but dwarfer; and *Crimson King* or *Kermesina*, dwarf, deep red.

The Virginian Stock is very effective in masses in borders, beds &c. It grows readily in almost any part of the garden and bears in great abundance its masses of sweet-scented blossoms. It is excellent for bordering beds of taller plants, and masses here and there in the rockery produce a charming picture.

Culture &c. as above.

ERYSIMUM (Hedge Mustard).—A genus containing, according to various authors, from 70 to nearly 120 species of biennial or perennial, hairy or sometimes hoary-looking herbs. Leaves variable, narrow, heart-shaped, stem-clasping, or pinnately cut, linear or oblong, entire, sinuate toothed, or rarely pinnatifid. Racemes bractless. Flowers mostly yellow, sometimes purple, and scented.

Culture and Propagation.—Very few species are worthy of cultivation, those described below being among the best and most showy border plants. They are easily raised from seeds sown in spring or autumn in the open border. From the end of March to the end of June sowings of the annual species may be made at intervals of 2 or 3 weeks, so that a long succession of blossom is maintained. The perennial species may not only be raised from seeds in the same way as the annuals but also increased by dividing the roots in autumn. They all grow freely in ordinary good garden soil in open sunny situations. Grown in large masses they are very effective and telling on the landscape owing to the warmth and brilliancy of colour of their flowers.

E. alpinum (*Cheiranthus alpinus*).—A Norwegian perennial 6 in. high, having straight simple stems, and lance-shaped distantly toothed leaves, covered with a starry down. Flowers in May, sulphur-yellow, sweet-scented, borne in loose racemes, and reminding one at a distance of some of the yellow Primulas, although the flowers, of course, have only 4 petals instead of 5.

Culture &c. as above. This pretty plant is best known as a Cheiranthus.

E. asperum.—A N. American biennial, about 8 in. high, with greyish hairy stems. Leaves linear oblong, lower ones toothed, runcinate, rough, downy. Flowers in July, yellow, the petals having white claws.

Culture &c. as above.

E. marschallianum. — A biennial, native of the Caucasus, about 1 ft. high, with lance-shaped toothed leaves narrowed at the base, and bright yellow flowers appearing in summer.

Culture &c. as above. This species may also be increased by placing cuttings of the flowerless shoots in light sandy soil under handlights in August and September, and protecting them until the following spring in case of severe frosts in winter.

E. ochroleucum (*Cheiranthus ochroleucus*).—A procumbent perennial, with branching stems, 6-12 in. high, native of the Alps of Java. Leaves oblong lance-shaped, somewhat toothed, hairy or smooth. Flowers from April to July, beautiful sulphur-yellow, faintly scented, petals obovate. The variety *helveticum* has narrower entire or toothed leaves, with somewhat ascending hairy stems.

Culture &c. as above. *E. ochroleucum* is a good rock plant, and if divided every year seems to do better than by other methods of increase. It may, however, also be increased by cuttings in the same way as *E. marschallianum* and by seeds. It is excellent for carpeting the soil and trailing over stones in the rock garden.

E. perofskianum. — This is a most showy species from the Caucasus, about 1 ft. high, with oblong lance-shaped leaves, and brilliant reddish-orange flowers in great masses during the spring, if the seeds are sown in autumn. By sowing in spring, flowers will appear in summer and autumn. It will grow anywhere.

Culture &c. as above.

E. pulchellum.—A very compact-growing perennial species attaining a height of about 1 ft. with dense tufts of oblong-elliptic toothed leaves. The sulphur-yellow flowers are freely produced in spring and summer and emit a faint odour. It is a native of the East, and is an excellent plant for dry borders. Owing to its tufted masses of foliage it makes a good carpet plant, and rivals the Aubrietias in this respect.

Culture &c. as above.

E. pumilum.—A charming perennial rock plant only 1-3 in. high, native of the Eastern Pyrenees. Leaves linear, lance-shaped, slightly toothed, greyish-green. Flowers in summer, pale sulphur-yellow, fragrant.

Culture &c. as above.

E. rhæticum.—A somewhat rare plant in cultivation. In summer its clear yellow blossoms are produced in great profusion above the dense masses of foliage.

Culture &c. as above.

E. Wahlenbergi.—A branching and showy perennial species about 2 ft. high, native of Transylvania. Its stems are clothed with lance-shaped toothed leaves and the bright yellow flowers are freely produced during the summer months.

Culture &c. as above.

STANLEYA.—A genus containing about 6 species of smooth perennial glaucous herbs resembling the *Arabis* in habit. Leaves undivided or pinnatifid. Racemes elongate, straight, many-flowered, bractless. Sepals short, spreading, equal at the base. Petals narrow, elongated, with long claws. Anthers twisted.

S. pinnatifida.—This pretty species from California is the only one at present grown. The thickish leaves are interruptedly pinnatifid, and the yellow flowers appear in May in great abundance on tall racemes.

Culture and Propagation.—It grows freely in soil with plenty of humus, and may be increased by seeds sown under glass in February or March or out of doors in April and May. Seeds may also be sown as soon as ripe in cold frames, and the seedlings may be pricked off in light soil and kept under protection during the winter months until favourable weather occurs for planting out in May. The plants may also be increased by division of the roots in early autumn or spring.

HELIOPHILA.—A South African genus of little-known annual or perennial herbs, or branching smooth or downy undershrubs, with entire, toothed, sinuate, or pinnatisect leaves. Racemes bractless. Flowers white, yellow, rose, or blue. Pedicels often slender. Pods often pendulous or deflexed.

Culture and Propagation.—The following species—all annual—are easily grown in ordinary good garden soil, and may be raised from seed sown out of doors in April and May, or earlier in spring under glass or on a gentle hotbed. The seedlings, if raised by the latter method, should be pricked off into light sandy soil and gradually hardened off so as to be ready for transferring to the open border about the end of May or beginning of June. A warm sunny position suits them best.

H. amplexicaulis.—A plant about 9 in. high, with oblong. heart-shaped stem-clasping entire leaves, the lower ones opposite, the upper alternate. Flowers from June to September, small, varying from white to purple.

Culture &c. as above.

H. coronopifolia.—This grows 1–2 ft. high, having pinnately parted leaves with entire linear lobes, and bluish-violet flowers from June to September.

Culture &c. as above.

H. pilosa. — Grows 6–12 in. high. Leaves hairy, lower ones lance-shaped, pinnatifid, upper ones linear, entire. Flowers in summer, blue. The variety *incisa* has linear, wedge-shaped leaves, trifid, rarely 5-fid at the apex, with linear or pointed lobes.

Culture &c. as above.

VELLA (False Cytisus; Cress Rocket). — A small genus of much-branched, rigid, woody, erect, sometimes spiny undershrubs, natives of Spain.

V. Pseudo-cytisus grows 2–3 ft. high, and has alternate, obovate, entire leaves, and yellow flowers in early spring, the long petals having dark purple claws.

Culture and Propagation. — This species, if grown in a dry, warm, sunny border, is hardy enough to stand the winter in most parts. It is increased by cuttings of the young shoots placed under a hand-glass during the summer months. Seeds may also be sown as soon as ripe in cold frames or in spring in gentle heat, and the young plants may be placed in the open ground about the end of May.

V. spinosa.—A much-branched spiny shrub 6–8 in. high, native of the Spanish mountains. The lower leaves are fleshy, and more or less lance-shaped, the upper ones linear with slender spines in the axils. The yellow flowers appear in early summer, and have long-clawed obovate spoon-shaped petals veined and netted with violet or purple.

Culture &c. as above. This species is very rarely seen, even in botanic gardens, but it makes a good rock plant in warm sheltered positions. Another species sometimes seen is *V. annua*—a mere annual weed not worth growing.

IONOPSIDIUM (Violet Cress).—A genus of 2 species of small, smooth annual herbs, with stalked or unstalked, spoon-shaped or rounded, entire or 3-lobed leaves. Flowers small, violet, white or flesh-coloured.

I. acaule. — A charming little plant rarely exceeding 2 in. high, native of Portugal and North Africa, and covered all over during the summer and autumn with lilac, or white tinged with violet flowers. These emit a sweet honey-like fragrance and are borne on slender stalks which issue from the axils of the small roundish leaves. There is a variety with pure white flowers.

Culture and Propagation.—This little annual flourishes on rockeries or rough places in ordinary soil, and in somewhat shady positions, where it frequently reproduces itself annually from self-sown seeds. Grown in pots or small shallow pans it is also very effective as a window plant. Seeds may be sown at intervals of 2 to 3 weeks in the open border from the end of March to the end of September to secure a succession of flower. Under favourable circumstances this plant comes into blossom about 8 or 10 weeks, more or less, after the seeds have been sown.

BIVONÆA.—A genus with only one species here described.

B. lutea.—A pretty little annual, native of Sicily, 3–6 in. high, with thread-like, sparingly branched stems. Leaves alternate, lower ones stalked, the others without stalks, heart-shaped, stem-clasping at the base, ovate, toothed, rather blunt. The small yellow flowers appear in April on terminal racemes, elongating as they grow. Pedicels thread-like, bractless.

Culture and Propagation. — This species thrives in dry sandy soil, and may be raised in spring from seeds sown in the open border where the plants are to bloom. If too thick, the seedlings may be thinned out so that the remaining plants will have sufficient space to develop properly. It is suitable for rockeries, the edges of borders &c.

ÆTHIONEMA.—A genus of pretty annual or perennial smooth herbaceous plants or undershrubs, with round stems and slender branches. Leaves without stalks, glaucous, the lower ones sometimes opposite. Flowers small, racemose, clustered, fleshy or purple; pedicels slender, bractless. The 4 larger stamens are winged, or prolonged into a tooth.

Culture and Propagation. — These plants grow freely in well-drained sandy loam in the flower border, and sunny situations, but dwarfer-growing species are more suitable for the rock garden. The annual and biennial kinds may be sown from April to June in the open border where they are to bloom. The perennials are also raised from seed, or from cuttings put in during the summer and shaded till rooted. In northern parts it is safer to protect the perennials raised from cuttings the first year in cold frames until favourable weather in spring when they may be planted out.

Æ. Buxbaumii (*Thlaspi arabicum*).—A pretty erect branching annual, 6 in. high, native of Thrace, with oblong spoon-shaped glaucous leaves, and crowded racemes of pale red flowers in June.

Culture &c. as above. Raised from seeds annually.

Æ. coridifolium (*Iberis jucunda*).—A pretty perennial, shrubby at the base, with erect stems 6–8 in. high. Leaves numerous, oblong, linear, glaucous, with a brownish point, and narrowed at the base. Flowers in June, rosy-lilac, prettily veined, and in dense terminal rounded racemes.

Culture &c. as above. This species, being a native of Asia Minor, is not altogether hardy in all parts of the United Kingdom. It is therefore better to grow it in rich light and well-drained soil in warm, sunny and sheltered parts of the rock garden where it will not be injured by the severe blasts from the north and east.

Æ. gracile. — A shrubby perennial, about 8 in. high, native of the sandy hills of Carniola, with lance-shaped pointed leaves and crowded terminal racemes of purplish flowers in June.

Culture &c. as above. Increased by seeds and cuttings.

Æ. grandiflorum.—A handsome bushy perennial about 1 ft. high, from Mount Lebanon, with ovate oblong, glaucous leaves. Flowers from May to August, of a warm shaded rose, in crowded terminal racemes. An effective rock plant.

Culture &c. as above. Increased by seeds and cuttings.

Æ. membranaceum. — A neat dwarf shrub 3–6 in. high, with thread-like branches, and native of Persia. Leaves oblong, linear, obtuse, various, somewhat fleshy, and clothing the stem rarely closely. Flowers in June, purple or rose, in small dense terminal racemes. Pods overlapping each other, roundish, with a very broad membranous margin, notched at the top.

Culture &c. as above. Increased by seeds and cuttings.

Æ. monospermum.—A pretty Spanish biennial 3–6 in. high, with stiffish branches, and leathery, more or less ovate, blunt leaves. Flowers in June, large, purple. Pods one-celled and one-seeded.

Culture &c. as above. Increased by seeds.

Æ. pulchellum. — Perhaps the handsomest and hardiest species, resembling *Æ. coridifolium*, but not yet very well known.

Culture &c. as above.

Æ. saxatile.—A pretty Spanish annual about 8 in. high, with lance-shaped, acute leaves, and loose terminal racemes of lilac-rose or purplish flowers in May and June.

Culture &c. as above. Increased by seeds. It loves a rather dry and rich loamy soil.

EUNOMIA.—A genus of 2 species of pretty little half-hardy evergreen, branched or tufted undershrubs or herbaceous plants, native of Asia Minor. Leaves stalkless and stem-clasping, entire, thickish. Flowers in short racemes, white.

E. oppositifolia.—A plant with decumbent branched stems 6–12 in. high, with opposite, almost round, entire, smooth leaves, and terminal racemes of white flowers in June.

Culture and Propagation. — This species may be grown in sheltered parts of the rockery in ordinary soil, and can be increased by cuttings taken in summer and put under a glass. Or seeds may be sown in April or May in the open border where the plants are to bloom. The seedlings may be thinned out. If sown earlier in the year, a little bottom heat is required and the seedlings may be pricked out and grown on for planting out at the end of May.

SCHOUWIA.—A genus of 3 species of very smooth branching annuals, natives of Arabia, with entire leaves, the upper ones deeply auricled and stem-clasping. Flowers at first corymbose, afterwards racemose, purple; pedicels slender. Sepals nearly erect, the lateral ones broader. Stamens free, without teeth.

S. arabica is a pretty annual about 1 ft. high, with rosy-purplish flowers in

June. The other characters as described above.

Culture and Propagation.—It grows freely in light sandy soil, and seeds may be sown in the open border in spring from the beginning of April to the end of June if a succession of flowers is required.

IBERIS (Candytuft).—A genus having about 20 species of annual or biennial smooth branched herbs or undershrubs, with entire or pinnatifid, often fleshy, leaves. Flowers racemose or corymbose, white or purple, the outer ones radiating. Sepals equal at the base. Petals 4, the 2 outer ones larger than the others.

Culture and Propagation.—All the Candytufts are easily grown in ordinary garden soil, in exposed sunny situations. The annuals and biennials are raised by seeds sown in the usual way, varying the date of sowing according to the period when it is required to have the plants in bloom. Thus, seeds may be sown as soon as ripe in cold frames so that a stock of strong sturdy plants will be ready for planting out in spring in mild weather. In February and March seeds may be sown in gentle heat, afterwards pricking the seedlings out, so as to enable them to develop previous to their being planted out about the end of May. In April and May seeds may also be sown in the open border where the plants are to bloom. When the seedlings are well above ground they must be thinned out, but not transplanted.

In this way a good succession of flowers may be obtained from early summer to the end of autumn.

The sub-shrubby perennial kinds are valuable plants for the border or rock garden, on account of their deep green masses of foliage, and clusters of flowers, which last a long time. The perennials may be raised from seeds, but it is generally more convenient to root cuttings during the summer months in a shaded border or under handlights; or to divide the plants after flowering. The stems may also be bent down and covered with light rich soil. In this way roots will develop as from layers, and the shoots may be detached in spring.

I. affinis.—A pretty annual or biennial species, native of France, rarely exceeding 8 or 9 in. high, with a much-branched tufted habit, and pinnately divided leaves. The flowers appear in spring and summer, and are of a pure white, the sepals only being tinted with violet before the buds open. An excellent little plant for borders and edging.

Culture &c. as above. Increased by seed.

I. amara (*Common Candytuft*).—A British annual 6–9 in. high, with lance-shaped, acute, slightly toothed leaves, and racemes or corymbs of white flowers in summer. The variety *hesperidifolia* is larger and prettier than the type, and is also more vigorous in growth.

Culture &c. as above. Increased by seeds.

I. bernardiana (*I. Bubani*).—A Pyrenean annual, 6 in. high, with spoon-shaped, lobed, deep glossy green leaves in dense compact rosettes, and corymbs of pink flowers in summer.

Culture &c. as above. Increased by seeds.

I. ciliata.—A rather smooth herbaceous biennial about 9 in. high, native of S.W. Europe. Leaves linear, entire, edges hairy at the base. Flowers in June and July, white. The variety *taurica* may be treated as an annual or biennial. It has somewhat fleshy leaves fringed with hairs, the lower ones spoon-shaped, sometimes with 2 teeth at the apex; the upper ones linear. Flowers white, corymbose, a little earlier than *ciliata* proper.

Culture &c. as above. Increased by seeds.

I. corifolia.—A Sicilian alpine 3–4 in. high, probably a small variety of *I. sempervirens*. Leaves linear, entire, blunt, smooth, in dense tufts. It has masses of small white flowers early in May, and looks well in the rock garden near the edge.

Culture &c. as above.

I. coronaria (*Rocket Candytuft*).—A beautiful annual, the native country of which is unknown. It is about 1 ft. high, with lance-shaped, entire, leathery leaves, and numerous long dense heads or spikes of pure white flowers, borne well above the foliage in summer. The form known as 'Giant Snowflake' is very fine.

Culture &c. as above. Increased by seeds.

I. correæfolia.—A splendid evergreen garden hybrid (probably between *semperflorens* and *saxatilis*) about 1 ft. high, with woody, slender, trailing branches. Leaves spoon-shaped, blunt, entire, smooth, about 1½ in. long. Flowers in May and June, white, large, in dense flat heads, lengthening with age into spikes about 8 in. long, the lower flowers opening first.

Culture and Propagation.—This is an excellent plant for almost any part of the flower garden, but especially for rockeries, edges of borders, nooks &c. As it does not come true from seed, it is best increased by cuttings or layers. It grows well in dry soil and hot sunny places.

I. **gibraltarica.** — A handsome but somewhat straggling evergreen, 1–2 ft. high, native of Gibraltar. Leaves wedge-shaped, blunt, fleshy, distinctly toothed at the apex, slightly ciliated, about 2 in. long. Flowers from Easter to Whitsuntide, large, white, often tinged with pink or red, in corymbose heads.

Culture &c. This species requires a well-drained soil in somewhat sheltered spots, as it may not be quite hardy in all parts of the country. The variety *hybrida* is a denser growing plant than the type, and has masses of creamy white flowers gradually deepening to a pretty rose-purple. Both species and variety are excellent plants for the rockery or flower border, and may also be grown to advantage in pots for the decoration of greenhouses and conservatories in the early part of the year.

I. **nana.**—A smooth herbaceous annual or biennial, only 8 in. high, native of Southern France and Italy. Leaves roundish, spoon-shaped, entire, rather fleshy. Flowers in June and July, purple.

Culture &c. as above. Increased by seeds.

I. **odorata.**—A native of Greece, annual, 6–12 in. high, with linear toothed leaves, ciliated at the base, dilated at the apex. Flowers in summer, white, sweet-scented, in racemes.

Culture &c. as above. Increased by seeds.

I. **petræa.**—A pretty alpine plant 8 in. high, with a flat cluster of pure white flowers, tinged with red in the centre, produced in summer.

Culture &c. as above. A well-drained moist position in the rockery is the most suitable place for this plant.

I. **pinnata.**—A pretty annual Candytuft 8–9 in. high, native of France, with downy much-branched stems and stalked pinnately cut or divided leaves, with blunt lobes. The white sweet-scented flowers appear from spring to autumn, according to the period of seed sowing, borne in dense corymbose clusters. The obovate petals are sometimes tinged with violet on the margins.

Culture &c. as above. Increased by seeds.

I. **Pruiti.**—A Sicilian perennial 6 in. high, with smooth stems sub-shrubby at the base, resembling *I. tenoreana.* Leaves obovate, spoon-shaped, entire or somewhat toothed. Flowers in May and June, pure white, in compact heads or corymbs.

Culture &c. as above. Increased by seeds, cuttings, or layers.

I. **saxatilis** (*Rock Candytuft*).—This dwarf shrub, 3–6 in. high, native of S. Europe, is the commonest and perhaps most useful of all the evergreen Candytufts. It has linear, entire, somewhat fleshy, ciliated leaves, and corymbs of white flowers in spring and early summer.

Culture &c. as above. Increased by seeds, cuttings or layers.

I. **semperflorens.** — A handsome but somewhat tender evergreen 1–2 ft. high, native of Italy, Sicily &c. Leaves wedge-shaped or spoon-shaped, rather fleshy, blunt, entire, smooth and of a deep green. Flowers from October to May, pure white, large, sweet-scented, in large, dense corymbs.

Culture &c. as above. Owing to its tender nature, this species should be grown in only the warmest, sunniest, and most sheltered spots of the rockery or flower border. It may be increased by seeds, cuttings, or layers, and prefers a somewhat chalky soil.

I. **sempervirens** (*Evergreen Candytuft*).—A well-known plant 9–12 in. high, native of S. Europe. Leaves smooth, oblong, blunt, narrowed at the base. Flowers in spring and summer, pure white, in long racemes. The variety *garrexiana* has somewhat smaller flowers borne on racemes which lengthen with age, and is less spreading in habit. *Superba* has a bushy habit and dense heads of white flowers; and *flore pleno* has double white flowers.

The Evergreen Candytuft and its varieties are excellent garden plants, suitable for almost any position, and apparently quite proof against the bitterest winter.

Culture &c. as above. Increased by seeds, cuttings, or layers.

I. tenoreana.—A pretty perennial 3–6 in. high, native of S.W. Europe. Leaves somewhat fleshy, crenated, lower ones obovate, narrowed at the base and fringed with hairs; upper ones oblong linear. Flowers in early summer, white changing to purple, freely produced in umbellate heads.

Culture &c. as above. This species is liable to perish in severe winters on cold heavy soils. On well-drained sandy soil it does well, and is better treated as a biennial than a perennial. It is easily reproduced from seed sown as recommended above.

I. umbellata.—This is the well-known pretty annual Common Candytuft, 6–12 in. high, native of S. Europe. Leaves lance-shaped, pointed, lower ones serrated, upper ones entire. Flowers in spring and summer, very variable in colour, but usually purple in terminal umbels. *Atropurpurea* has dark crimson flowers; *carnea*, blush or pale flesh-coloured; *nana purpurea*, dwarf, deep purple; *purpurea lilacina*, dwarf, lilac-purple. There are several other varieties mentioned in catalogues, chiefly distinguished by the colour of the flowers.

Culture and Propagation.—This group of Candytufts likes a rich soil, and produces the finest flowers in spring from seeds sown in autumn. General cultivation &c. as above for annuals.

I. violacea.—A dwarf annual, 3 in. high, with stalked, spoon-shaped, bluntly toothed or entire, ciliated leaves. Flowers in summer, purple, in umbellate corymbs.

Culture &c. as above. Increased by seeds.

HUTCHINSIA.—A genus with only one or two species of small and rather smooth annual herbs, having the lower leaves usually in rosettes, and pinnately lobed. Scapes several, ascending, leafy. Flowers sub-corymbose, small, white, on elongated bractless pedicels.

Culture and Propagation.—These are pretty plants for the rock garden, edges of borders &c., in sandy soil. They are raised from seed like other annuals, either in gentle heat about February and March, afterwards pricking the seedlings out and hardening them off before placing in the open air at the end of May; or the seeds may be sown in the open border from April to the end of June for a succession of flowers.

H. alpina.—A pretty little alpine with shining green leaves, and clusters of small white flowers on stalks about 1 in. high.

Culture &c. as above.

H. petræa.—A more or less glabrous, erect, delicate annual, native of limestone rocks in Britain and Central and S. Europe, with lower leaves pinnate, and masses of minute white flowers.

Culture &c. as above.

IBERIDELLA.—A genus containing 6 species of rather pretty herbs or undershrubs, often branched and woody at the base, smooth, with alternate or opposite entire leaves, those of the stem often auricled, or cordately sagittate. Flowers racemose, white or rose.

I. rotundifolia. — A native of the European Alps, 3–6 in. high, spreading, densely tufted, with opposite, fleshy, broadly ovate leaves. Flowers in early summer, rosy-lilac, with a yellow eye, fragrant, about ½ in. across, in erect, cylindrical, crowded racemes.

Culture and Propagation. — This species is adapted for the rock garden, and thrives in rather light sandy soil. It may be increased by seeds sown as soon as ripe in cold frames or in the open border in April and May. Or the plants may also be divided in early autumn, and cuttings of the shoots may be inserted in light sandy soil in a shaded border during the summer months.

TCHIHATCHEWIA.—A genus with only one species:—

T. isatidea.—A pretty Armenian rock-plant about a foot high, with very hairy oblong linear toothed leaves. The bright rosy-lilac and vanilla-scented flowers appear in May, and are borne in racemes about a foot across on thick fleshy stalks.

Culture and Propagation. — This plant flourishes in ordinary well-drained soil in the rock garden, and being a biennial should be raised from seeds sown in cold frames when ripe every year so as to keep up a stock of plants. The young plants may be transferred to the open air in spring, or in autumn if large enough.

PELTARIA.—A genus consisting of 8 species of tall glabrous perennial herbs, with entire leaves, the upper ones of which are cordate-sagittate at the base. Flowers more or less in corymbs, white. Pods large.

P. alliacea.—A pretty plant about 1 ft. high, native of E. Europe, and emitting a Garlic-like odour. The white flowers appear in June, followed by flat, smooth seed pods.

Culture and Propagation. — It will grow in any light soil, and may be increased by seeds or dividing the roots in the same way as recommended above for *Iberidella.*

ISATIS. — A genus of annual, biennial, or perennial smooth glaucous or downy herbs with entire leaves, those of the stems being sagittate. The flowers are usually yellow and borne in loose racemes. Sepals equal at the base. Stamens free. Fruit-pod a linear, oblong, ovate, roundish or wedge-shaped siliqua.

There are about 30 species in this genus, the best known being the native Dyer's Woad (*I. tinctoria*) so much in use by the ancient Britons for staining their bodies. With the exception of the species described below, the others are of no garden value.

I. glauca.—A beautiful perennial 3-4 ft. high, native of Smyrna. The light green furrowed stems are clothed with glaucous - green oblong lance - shaped leaves 6 in. long, having a whitish midrib. The small clear light yellow flowers appear in July, and are borne in immense numbers in large loose branched racemes which look very handsome and effective.

Culture and Propagation. — This species is not yet well known. It thrives in ordinary good garden soil in warm and sheltered positions in the flower border. Being a true perennial it may be increased by careful division in spring or early autumn ; or by seeds sown in cold frames when ripe or in spring.

BOLEUM.—A genus with only one species here described :—

B. asperum.—An ornamental evergreen shrub, 6–12 in. high, native of France, covered with rather stiffish hairs, and having alternate oblong-linear, entire leaves, the lower ones somewhat divided. Flowers in April, creamy yellow, in short erect and elongated racemes. Sepals erect, equal at the base. The longer stamens united in pairs.

Culture and Propagation.—In severe winters this plant would probably require protection in northern parts of the country. It grows well in ordinary soil, and may be increased by seeds sown in a hotbed in spring, or in the open border in summer. Cuttings of the young shoots may also be rooted in light sandy soil under a handlight during the summer months. The plants thus raised may be protected in cold frames until favourable weather in spring will permit of their being planted out.

CRAMBE (Sea Kale).—A genus with 16 species of herbs or undershrubs having thickened rootstocks and branched and glaucous smooth or hairy stems, furnished with large and often pinnately cut leaves. Flowers in elongated branched racemes or panicles.

Culture and Propagation.—The Sea Kale (*C. maritima*) is probably the best known representative of the genus, and its culture &c. is fully dealt with in the Vegetable section of this work at p. 1121. The species described below are the only ones at present known of any value as decorative plants. They are rather large and coarse growing, but when in full blossom are among the showiest and most attractive of flowering plants, chiefly on account of the immense numbers of blossoms they produce. They flourish in any garden soil and are more suitable for wild parts of the garden in open sunny spots, for association with such plants as *Heracleum giganteum*, p. 469, *Buphthalmum speciosum*, p. 511, &c. They ripen seeds freely and may be increased by that means sown out of doors or in cold frames as soon as ripe or in spring. The roots may also be divided at the latter season as growth is commencing.

C. cordifolia.—A vigorous and deep-rooting Caucasian perennial about 6 ft. high, with tufts of large radical heart-shaped lobed, wavy, and wrinkled leaves 12–18 in. wide. The white cross-shaped flowers are produced in immense numbers in June and early July, and are borne in much - branched panicles, which stand about 3 ft. above the foliage and are 4–6 ft. through, the branchlets spreading horizontally, or drooping at the base.

Culture &c. as above. Grows well in shade.

C. pinnatifida. — Another remarkable Caucasian perennial 4-5 ft. high, with pinnately divided and lobed leaves somewhat resembling those of a Turnip, only being much larger. The flowers appear at the same time as those of *C. cordifolia*, but the branching panicles are not quite so large, and the branchlets are rather ascending than horizontal and descending. It makes a good companion for *C. cordifolia* in the wilder parts of the garden.

Culture &c. as above.

MORISIA.—A genus with only one species here described:—

M. hypogæa. — A charming little perennial 2-3 in. high, native of the Sardinian mountains. The smooth, deep and shining green leaves are more or less cut and lobed like those of Dandelions, and form dense tufts on the surface of the soil. The clear bright yellow flowers about an inch across, and with wedge-shaped petals, are produced in great profusion in April and May, just topping the foliage. The roundish one-seeded fruit pods are buried in the soil, but they do not ripen seeds freely in our climate.

Culture and Propagation. — This pretty plant flourishes in rich, damp, sandy loam in the flat border or in the rockery. It may be increased by seeds which should be sown when ripe, or failing these the plants may be divided in spring.

XII. RESEDACEÆ—Mignonette Order

Annual or perennial herbaceous plants, rarely shrubs, with alternate, entire, or pinnately divided leaves, and minute gland-like stipules. Flowers irregular, hermaphrodite, or rarely unisexual, borne in racemes or spikes, and furnished with bracts. Calyx persistent, 4–7-partite, often irregular, imbricate in bud. Petals 4–7, rarely 2 or none, deciduous or persistent, hypogynous or perigynous, entire or 3 to many partite. Disc hypogynous, conspicuous and glandular. Stamens usually many (3–40), perigynous or inserted on the disc, equal or unequal, free or connate. Ovary sessile or stalked with 2–6 connate carpels, lobed at the top, and open between the stigma-bearing lobes, with numerous ovules. Fruit dry and membranous, or succulent, opening at the apex; or apocarpous, with empty carpels surrounding a central placenta, or hooded and 1-seeded. Seeds kidney-shaped.

RESEDA (Mignonette). — A genus containing about 26 species of erect or decumbent, smooth or hairy, annual or biennial herbs, with entire, lobed, or pinnatisect leaves, having gland-like stipules. Flowers racemose, with bracts. Calyx 4–7-parted. Petals 4–7, hypogynous, unequal, twice or many times cut. Torus almost sessile, urn-shaped, dilated behind. Stamens 10–40, inserted in the torus. Capsule indehiscent, 3-lobed at apex. Seeds numerous.

The following are the only species of any garden value, but *R. lutea* with greenish-yellow flowers and *R. Luteola* (the Dyer's Rocket or Dyer's Weed) with small pale yellow flowers are to be met with in botanical collections.

R. alba.—A fine biennial about 2 ft., native of S. Europe. Leaves all pinnatifid or sometimes interruptedly pinnate, segments lance-shaped, smooth, rarely wavy. Flowers from May to September in dense, erect spikes, with white petals, brownish anthers, and a 5–6-parted calyx.

Culture and Propagation. — When given plenty of space to develop, this species makes a fine and effective border plant, and will grow in ordinary garden soil. Seeds may be sown in the open border in April and May, and the plants afterwards thinned out to about 1 ft. or 18 in. apart.

R. odorata (*Mignonette*). — This universal favourite is a native of N. Africa, Egypt &c., and has lance-shaped, blunt, entire or trifid leaves. Flowers out of doors from June to October, in loose racemes. Petals yellowish-white, finely cleft into several club-shaped filaments; anthers saffron-yellow, and calyx 6-parted. The variety *frutescens* is simply a shrubby form of this species. There are many garden forms, among which may be mentioned 'Machet' with fine bold spikes of flowers in which the red-brown anthers are so conspicuous, 'Golden Machet,' 'Golden Queen,' 'Miles' Spiral,' 'Victoria,' 'Prince Bismarck,' 'White Diamond,' 'Parson's White' &c., all worth growing.

Culture and Propagation.—Were it not for the delicious fragrance of its flowers it is doubtful if the Mignonette would receive any attention at all in gardens. If sown in open patches in borders or beds, at the end of March or April till midsummer, in a few weeks the plants will be producing trusses of fragrant flowers, which may be cut freely. It is important to sow rather thinly, and even then it will be necessary to thin the plants severely, at the same time pinching out the tips of the strongest shoots on the plants left. This treatment will result in strong bushy plants.

If sown in the autumn, the plants will survive mild winters, and will flower early in spring in the milder parts of the kingdom.

If required in pots, it is best to sow the seeds in spring in gentle heat, say a dozen seeds or so in each pot, afterwards thinning down to one, two, three, or five plants, according to the size of the pot. By judiciously pinching the points, one bushy plant will ultimately be found sufficient for a pot. The shrubby variety, *frutescens*, may be cultivated in pots for four or five years, by giving attention to pinching out the tips of the shoots so as to cause the side shoots to develop, and also by picking off the flowers as soon as they fade. The energy of the plant is thus not wasted in producing seeds, and is utilised for the development of more shoots. In this way quite large specimens can be obtained.

The soil for Mignonette in pots should be a rich and light sandy loam, with a little leaf mould.

XIII. CISTINEÆ—Rock Rose Order

Perennial herbs, shrubs, or undershrubs, often with viscid branches. Leaves entire, opposite or alternate, generally feather-veined, sometimes fan-veined. Stipules leafy, small or none. Flowers usually hermaphrodite, regular, solitary and terminal, or in scorpioid cymes; very fleeting; white, yellow, or red, never blue. Sepals 3–5, imbricate, the two outer ones small or absent, the three inner twisted in bud. Petals 5, rarely 3 or none, fleeting, often crumpled in bud. Stamens numerous, rarely few, hypognous, free; ovary 1- or many-celled, with 3 stigmas. Fruit a 3–5 (rarely 10) valved capsule.

CISTUS (GUM CISTUS; ROCK ROSE). A genus containing about 20 well-defined species of beautiful shrubs, rarely undershrubs, often somewhat viscid, with opposite entire or somewhat toothed leaves without stipules. Flowers often beautiful, like Wild Roses, in terminal cymes or panicles, rarely sub-racemose or solitary. Petals 5, usually with a differently coloured blotch at the base. Stamens numerous.

Culture and Propagation. — It is somewhat unfortunate that lovely plants like the Rock Roses will grow well only in the warmest and most congenial parts of the British Islands. The flowers, though very fleeting individually, not lasting more than a day or so, are produced in such numbers in succession that the bushes always look full of bloom, and make a lovely picture. A rich, light, sandy soil, and sheltered position facing south, are best, and a little extra protection in hard winters would probably save many a plant which now dies.

The Rock Roses may be increased by seeds, layers or cuttings. The latter should be about 3 or 4 in. long, and placed in sandy peat under handlights in early autumn. Layers may be made almost at any time. Seeds, however, give better plants. They should be sown early in spring in light soil under glass, and when the plants are 1–2 in. high, they may be shifted singly into small pots, and kept close and shaded in the frame for some time to get established. When hardened off by gradually allowing more air and sunshine, the plants may then be transferred to the outdoor garden in mild showery weather the following spring.

C. albidus.—A native of S.W. Europe, 2 5 ft. high, with stalkless, oblong elliptic, hoary or woolly leaves, somewhat 3-nerved. Flowers in June, 2–3 in. across, pale purple or rose, yellow at the base, petals overlapping.

Culture &c. as above.

C. candidissimus (*Rhodocistus bertholetianus*).—A shrub 4 ft. high, native of the Grand Canary Islands. Leaves ovate, elliptic, acute, covered with hoary wool, 3-nerved; stalks short, sheathing at the base, with hairy margins. Flowers in June, pale rose.

Culture &c. as above.

C. Clusii. — A native of Spain and Portugal, 2 ft. high. Leaves somewhat 3-nerved, linear, with revolute edges, hoary beneath. Flowers in summer, white, in heads, bracts hairy, broadly ovate, pointed, ciliate, deciduous, rather longer than the flower stalks. The true plant is rarely seen in cultivation, that which bears its name being usually *C. monspeliensis.*

Culture &c. as above.

C. creticus.—A native of Crete, 2 ft. high, with spoon-shaped, ovate leaves, wrinkled, covered with hairy wool, waved at the edges. Flowers in June, pale purple, yellow at the base. Sepals hairy. This is now regarded as a variety of *C. villosus.*

Culture &c. as above.

C. crispus.—A native of S.W. Europe, 2 ft. high. Leaves stalkless, linear, lance-shaped, waved and curled, 3-nerved, wrinkled, downy. Flowers in June and July, about 2½ in. across, almost stalkless, reddish-purple.

Culture &c. as above.

C. cupanianus.—A Sicilian plant, 2 ft. high. Leaves stalked, heart-shaped, ovate, wrinkled, net-veined, upper surface rough, lower covered with fascicled hairs, margins fringed. Flowers in June, white, with a spot of yellow at the base of each imbricating petal. Sepals hairy.

Culture &c. as above.

C. cyprius.—A native of Cyprus, 4–6 ft. high. Leaves stalked, oblong, lance-shaped, smooth above, covered with hoary wool beneath. Flowers in June, about 3 in. across, white, with a dark spot at the base of each petal.

Culture &c. as above.

C. heterophyllus.—An Algerian plant 2 ft. high, with ovate, lance-shaped, short-stalked leaves, sheathing at the base, margins revolute. Flowers in June, large, red, yellow at the base, on hairy leafy stalks.

Culture &c. as above.

C. hirsutus.—A native of S.W. Europe, 2 ft. high, with unstalked, oblong, blunt, hairy leaves. Flowers in June, about 2 in. across, white, with a yellow mark at the base of the petals.

Culture &c. as above.

C. ladaniferus (*Gum Cistus*). — A native of Spain, 4 ft. high. Leaves almost stalkless, connate at the base, linear lance-shaped, 3-nerved, clammy above, woolly beneath and 4–5 in. long. Flowers in June, about 3 in. across, white, terminal, solitary. The variety *maculatus* has a dark blood-red blotch at the base of each of the white petals; while *albiflorus* has only a yellow stain at the base of the white petals.

Culture &c. as above.

C. latifolius.—A native of Barbary 3 ft. high. Leaves stalked, broadly heart-shaped, acute, with curled, wavy, toothed and ciliated margins. Flowers in May, white, with a yellow spot at the base of each petal.

Culture &c. as above.

C. laurifolius. — A native of S.W. Europe, 5–6 ft. high. Leaves stalked, ovate, lance-shaped, 3-nerved, smooth above, woolly beneath, stalks dilated and connate at the base. Flowers from June to August, about 3 in. across, white, with a yellow spot at the base of each petal, and borne in umbel-like clusters. There is a somewhat rare variety called *maculatus*, recognised by the deep purple-crimson blotch at the base of the white petals.

Culture &c. as above.

C. laxus.—A native of S. Europe, 3 ft. high. Leaves shortly stalked, ovate, lance-shaped, pointed, with wavy, somewhat toothed edges, upper ones hairy. Flowers in July, white, with yellow spots at the base. Flower stalks and sepals hairy.

Culture &c. as above.

C. longifolius.—A native of Spain and S. France. Leaves shortly stalked, oblong, lance-shaped, with waved and downy edges, veined beneath. Flowers in June, white, spotted with yellow at the base.

Culture &c. as above.

C. lusitanicus. — Probably a hybrid between *C. ladaniferus* and *C. mons-*

peliensis, forming a dense compact bush 3–5 ft. high. It has deep green leaves and large white flowers with a purple blotch at the base of each petal.

Culture &c. as above.

C. monspeliensis.—A plant 4 ft. high, native of S. Europe, with linear, lance-shaped, stalkless, 3-nerved, clammy leaves, hairy on both surfaces. Flowers in July, 1–1½ in. across, white, borne in clusters of from 5 to 20 according to the vigour of the plant; petals imbricate and crenate with a yellowish blotch at the base. The variety *florentinus* has narrow, lance-shaped, wrinkled, almost stalkless leaves, veined beneath. The white flowers, yellow at the base and tipped with rose, are about 2 in. across and are produced somewhat earlier than those of the type.

Culture &c. as above.

C. oblongifolius.—A native of Spain, 4 ft. high, with hairy branches. Leaves shortly stalked, oblong lance-shaped, blunt, downy and waved at the edges, veined beneath. Flowers in June, white, concave, spotted with yellow at the base.

Culture &c. as above.

C. obtusifolius. — A Cretan species, 12–18 in. high, with a spreading habit. Leaves almost stalkless, tapering to the base, ovate-oblong, blunt, wrinkled, downy, margins somewhat toothed. Flowers in June, about 2 in. across, white, spotted with yellow at the base, several in a cluster.

Culture &c. as above.

C. parviflorus.—This is also a native of Crete and has a spreading habit like *C. obtusifolius*. The shoots are furnished with downy twisted leaves about an inch long, and the small pale rosy flowers, about 1 in. across, are borne in June in cymes or clusters at the ends of the shoots.

Culture &c. as above.

C. populifolius. — Native of S.W. Europe, 3–8 ft. high, with heart-shaped, pointed, wrinkled, smooth leaves, remarkable for having stalks 1½–2 in. long. Flowers in May and June, about 2 in. across, white, borne in cymose clusters; sepals clammy, bracts oblong.

Culture &c. as above.

C. psilosepalus.—A plant 2–3 ft. high, native country unknown. Leaves shortly stalked, oblong lance-shaped, 3-nerved, acute, waved at margins, somewhat toothed and ciliate, rather hairy. Flowers from June to August, white with a yellow spot at the base of each broadly wedge-shaped petal. Sepals long pointed, smooth, shining, with ciliated edges.

Culture &c. as above.

C. purpureus.—A native of the Levant, 2–4 ft. high. Leaves oblong lance-shaped, pointed at each end, wrinkled, with short hairy sheathing stalks. Flowers in June, reddish-purple, with a dark purple spot at the base.

Culture &c. as above.

C. rotundifolius.—A native of South Europe, 1 ft. high. Leaves roundish ovate, blunt, flat, wrinkled, net-veined, with fascicled hairs on both sides, stalks furrowed, somewhat sheathing at the base. Flowers from June to September, purple spotted with yellow at the base. Sepals heart-shaped, hairy. Flower stalks very hairy. This is now considered to be a variety of *C. villosus*.

Culture &c. as above.

C. salvifolius.—Native of S. Europe, 2 ft. high, with many varieties. Leaves stalked, ovate, blunt, wrinkled, woolly beneath. Flowers from June to August, white, medium-sized, with woolly stalks.

The variety *corbariensis* (also known as *C. cordifolius*) is supposed to be a natural hybrid between this species and *C. populifolius*. It grows in the south of France to 2 ft. high or more. Leaves rather heart-shaped, ovate, pointed, with fringed margins, wrinkled on both surfaces, and very clammy. Flowers in June and July, 1½–2 in. across, white, with a yellow centre, each flower being on a long stalk.

Culture &c. as above.

C. vaginatus.—A native of Teneriffe, 2 ft. high. Leaves lance-shaped, acute, 3-nerved, hairy, net-veined beneath; stalks furrowed, dilated and sheathing at the base, with pilose margins. Flowers from April to June, deep rose.

Culture &c. as above.

C. villosus (*C. incanus; C. undulatus*). Native of S. Europe, 3 ft. high. Leaves stalked, roundish ovate, wrinkled, woolly and hairy; stalks furrowed, connate at the base. Flowers in June, large, reddish-purple, about 2½ in. across. The variety *canescens* is dwarfer and has oblong linear, bluntish, woolly, waved leaves, 3-nerved, without stalks and somewhat connate at the base. Flowers in May, dark purple, tinged with blue, spotted with yellow at the base of each crenulate petal. Sepals downy.

Culture &c. as above.

HELIANTHEMUM (SUN ROSE).—A genus of about 80 distinct species of annual or perennial herbs or shrubs, often prostrate, with opposite and alternate leaves. Flowers usually smaller than those of the Rock Roses, in secund racemes, sometimes corymbose, sometimes paniculate. Petals broad, 5 (in perfect flowers); stamens numerous, rarely few. Stigma capitate, or crestedly 3-lobed.

Culture and Propagation.—The Sun Roses grow freely in sandy loam, and are splendid plants for the rock garden, where they form compact masses of lovely flowers and foliage. The annual kinds are raised from seeds in the usual way in gentle heat about March, the seedlings being pricked off into light rich soil, and grown on until fit for the outdoor garden at the end of May. The perennials may also be increased in this way, but they are more easily obtained from cuttings, which root readily in sandy soil in a shady place during the summer months under a handlight.

H. atriplicifolium.—A woolly shrub 4 ft. high, native of Spain. Leaves stalked, broadly ovate, bluntish, waved at the base, woolly on both sides. Flowers in June, large, yellow, on hairy stalks.

Culture &c. as above. Increased by seeds or cuttings.

H. canadense.—An erect, herbaceous, downy, Canadian species, 1 ft. high. Leaves oblong linear, margins usually revolute, woolly beneath. Flowers in summer, minute, crowded; stalks very short, 1–3-flowered.

Culture &c. as above.

H. carolinianum.—A native of the S. United States, 6–12 in. high, shrubby at the base. Leaves shortly stalked, lance-shaped, toothed, hairy. Flowers in May and June, yellow, 1 in. across.

Culture &c. as above.

H. formosum. — A hoary-branched Portuguese shrub, 4 ft. high. Leaves shortly stalked, obovate lance-shaped, covered with hairy wool, the younger ones hoary. Flowers in summer, large, yellow, spotted with black at the base; stalks hairy. This has been also called a Cistus.

Culture &c. as above.

H. Fumanum.—An elegant Heath-like undershrub, native of S.W. Europe, with linear fleshy and slightly hairy leaves, and bright yellow flowers in June.

Culture &c. as above.

H. globulariæfolium.—An herbaceous species, about 9 in. high, native of Spain and Portugal. Lower leaves long-stalked, ovate-oblong, hairy, furrowed above; the upper ones stalkless, lanceolate. Flowers in summer, citron-yellow, black-spotted at the base of the petals and borne in dense racemes.

Culture &c. as above.

H. guttatum.—A native annual of stony places in Britain, Europe, North Africa, and W. Asia. Stem 6–12 in. high, with branches 2 or 3 times forked. Leaves 1–2 in. long, linear or obovate, or oblong lance-shaped, lower ones opposite without stipules, the upper ones alternate with stipules. Flowers from June to August, ½ in. across, yellow with a red spot at the base of each wedge-shaped petal.

Culture &c. as above. Increased by seeds sown annually.

H. halimifolium.—A shrub 3–4 ft. high, native of Spain. Leaves downy, ovate lance-shaped, acute, wavy. Flowers in summer, large, bright yellow, slightly spotted at the base.

Culture &c. as above. Increased by seeds or cuttings.

H. italicum.—A European species only 8 in. high, with long, procumbent, hairy branches. Lower leaves stalked, ovate; upper ones almost stalkless, linear oblong. Flowers in summer, small, yellow; racemes simple, hairy.

Culture &c. as above.

H. lævipes.—A pretty shrub of S.W. Europe, 1 ft. high, with linear, needle-shaped leaves, and yellow flowers in summer. This species requires protection in severe winters.

Culture &c. as above.

H. lavandulæfolium. — A hoary branched undershrub 1 ft. high, from the Mediterranean region. Leaves oblong-linear, hoary, with revolute margins, under surface woolly. Flowers in summer, yellow, in crowded racemes.

Culture &c. as above.

H. ocymoides.—An undershrub 1–8 ft. high, native of S.W. Europe. Leaves stalkless, ovate, lance-shaped, blunt. Flowers in summer; petals yellow, crenate, with a dark base. *H. algarvense*, *H. candidum* and *H. rugosum* are forms of this variable species.

Culture &c. as above.

H. polifolium (*H. pulverulentum*).—A rather rare British plant, but also distributed over Central and Southern Europe, and N. Africa. Leaves opposite, hoary and downy on both sides, with recurved edges. Flowers white, from May to July, marked with yellow at the base of the petals.

Culture &c. as above.

H. scoparium.—A Californian perennial about 8 in. high, with alternate, linear leaves without stipules. Flowers in May and June, small, yellow, in twos and threes at the ends of the branches; sepals 5, of which 8 are ovate-acute, and 2 awl-shaped.

Culture &c. as above.

H. umbellatum.—A perennial 9–18 in. high, with linear oblong leaves, recurved and ciliated at the edges, clammy when young. Flowers in June, pure white, in a whorled raceme ending in an umbel.

Culture &c. as above.

H. vineale.—A European shrubby evergreen, with variable obovate, ovate, or elliptic hairy leaves, and simple racemes of yellow flowers in summer.

Culture &c. as above.

H. vulgare (*H. surreianum; Cistus tomentosus*).—This is the Common Sun Rose of Britain, and from it have sprung most of the beautiful garden varieties. It is a shrubby procumbent plant 8–10 in. high, with opposite, oblong, stipulate leaves, hairy above, downy beneath. Flowers from June to September, more than 1 in. across, yellow, borne in loose racemes.

Among the many varieties may be mentioned: *barbatum*, with ovate or elliptic lance-shaped leaves, covered with white hairs; *hyssopifolium*, with flat, linear lance-shaped leaves, and saffron-coloured or coppery-red flowers, with also a double form of the latter; *macranthum*, with flat, ovate oblong, acutish leaves, smooth above, densely woolly beneath, and white flowers yellow at the base; *mutabile*, with pale rose-coloured flowers, yellow at the base, changing to white with age; and *ovalifolium* (or *serpyllifolium*), with roundish or ovate glossy green leaves, white beneath, and yellow flowers.

Culture &c. as above.

HUDSONIA.—A genus consisting of 8 species of distinct evergreen, Heath-like, tufted undershrubs, with small, needle-like, imbricated, downy leaves. Flowers small, yellow, numerous, crowded along the upper ends of the branches. Petals 5, small, fugacious. Stamens numerous.

Culture and Propagation.—The Hudsonias require a well-drained peaty or sandy soil, and should be grown in sheltered sunny spots. They do not grow well in pots, but may succeed better in the rockery or border where they would remain undisturbed at the roots. They may be increased by layers in summer, or by cuttings put under a glass and protected until the following spring, when they may be planted out in favourable weather.

H. ericoides.—A native of the Eastern United States, 1 ft. high, with needle-like leaves, and yellow flowers from May to July.

Culture &c. as above.

H. tomentosa.—A hoary and downy N. American plant, with oval or narrowly oblong, short, close-pressed and imbricated leaves, and sessile or short-stalked yellow flowers in early summer.

Culture &c. as above.

XIV. VIOLARIEÆ—Viola and Pansy Order

Herbs or shrubs with alternate, rarely opposite, simple, entire, or rarely lobed leaves, and small or leafy stipules, which are usually deciduous in shrubby species. Flowers usually hermaphrodite, axillary, regular or irregular, solitary or in racemose or panicled cymes, 2-bracteolate. Sepals 5, often persistent, equal or unequal, imbricate in bud, and usually elongated into a spur at the base. Petals 5, hypogynous or slightly perigynous, equal or unequal, imbricate or often contorted in bud. Stamens 5, hypogynous, or slightly perigynous; filaments dilated, with connectives produced beyond the anthers. Ovary sessile, free, 1-celled, many-seeded. Fruit a 3-valved, dehiscent capsule, rarely an indehiscent berry.

VIOLA (VIOLET; PANSY; HEARTSEASE).—A genus containing over 200 species according to some authors, but reduced to about 100 by Bentham and Hooker, mostly pretty perennial herbs, rarely shrubs, with alternate leaves, and persistent, often leafy, stipules. Flower stalks axillary, 1- rarely 2- flowered. Sepals almost equal, produced at the base. Petals spreading, the lower ones often larger, spurred or saccate at the base. Anthers connate and produced at the apex, the 2 lower stamens often spurred at the base.

Violas often produce two kinds of flowers—the large petalled ones, which appear first and often yield no seed; and the smaller petalled, or non-petalous ones, which appear later, and produce seed freely, being often fertilised in bud, when they are said to be 'cleistogamous.'

Culture and Propagation.—Generally speaking Violas of all kinds are among the most easily grown plants in gardens. They delight in a rich, moist, sandy soil but dislike stagnant water at the roots and a position that is never shaded from the scorching rays of the summer sun. As most of them grow naturally in banks, copses, more or less marshy places, pastures &c., where they are to a certain extent shaded by the overhanging branches of trees, or by the leaves of the surrounding vegetation, they thrive under somewhat similar conditions in a cultivated state. The cultivation of Sweet Violets (*V. odorata*) and Pansies (*V. tricolor*) is dealt with under their respective species.

Violas are easily increased by seeds, cuttings, or division. If desired to flower the same year, say in autumn, the seeds should be sown in spring in the open border during April and May in light rich soil. If the flowers are wanted in spring, the seeds may be sown in August or September so that the seedlings will be strong and well-established for the winter months. The seedlings may be either pricked out and transplanted once or twice to induce the development of masses of fibrous roots, or they may be thinned out in the spot where the seeds have been sown. Cuttings may be taken early in April and inserted in a prepared patch of fine sandy soil in a shady border, and protected by handlights or frames, until well rooted. By September they may be transplanted to their permanent quarters, and will give a good supply of bloom the following spring. If planted in beds by themselves they should not be nearer than 1 ft. apart so as to admit of hoeing. After flowering the plants may be lifted and carefully divided into as many pieces as possible, and replanted, each rooted portion making a good tuft for next season's flowering.

V. altaica.—A native of the Altaian Mts. with hard creeping slender roots. Leaves oval, with sharply toothed wedge-shaped stipules. Flowers from March to June, yellow, large, with acute toothed sepals, and an urn-shaped stigma.

Culture &c. as above.

V. arenaria.—A somewhat rare British species, compact in growth, and covered with a hoary down, the whole plant 2–6 in. across. Leaves roundish, ovate, blunt. Flowers from April to June, with broad pale blue petals, and a short spur.

Culture &c. as above.

V. biflora.—A pretty little Violet 3–4 in. high, widely distributed throughout Asia, Europe, and America. Leaves kidney-shaped, serrated, smooth, with ovate stipules. Flowers from April to June, small, yellow, the lip streaked with black, usually in pairs, petals smooth; spur very short, sepals linear, stigma bifid.

Culture &c. as above. This curious little Violet requires well-drained sandy peat and loam, and may be increased by dividing the roots in early autumn or in spring, and also by seeds sown as above. It dislikes sunny places.

V. blanda.—An American species with creeping rootstock, and roundish, heart-shaped or kidney-shaped, slightly downy leaves. Flowers in early spring, white, small, faintly scented; petals almost beardless, the side ones veined with lilac; spur short.

Culture &c. as above.

V. calcarata.—A very variable fibrous-rooted species, native of the Austrian Mountains. Leaves roundish or spoon-shaped, crenate, stipules palmately cut or trifid. Flowers in early summer, light blue or white; sepals oblong, glandularly toothed; spur awl-shaped, longer than the calyx. The variety *flava* or *Zoysii* has yellow flowers; *albiflora* has large white flowers, and *Halleri* large blue ones.

Culture &c. as above for *V. biflora.*

V. canadensis. — A free-growing N. American species 6–9 in. high, with alternate broadly heart-shaped, pointed, serrate leaves. Flowers from May to August, whitish inside, the upper petals mostly tinged with violet beneath, the side ones bearded; spur very short.

Culture &c. as above. A very suitable plant for sloping banks or the rockery. Easily increased by dividing the roots in spring or early autumn; also by seeds and cuttings.

V. canina (*Dog Violet*).—A very variable species, native of British pastures and banks. Leaves 1–3 in. across, long-stalked, crenate serrate, varying from broadly ovate heart-shaped to lanceolate. Flowers ½–1¼ in. across, from April to August, blue, lilac, grey, or white; sepals narrow pointed; spur blunt; style club-shaped, hooked. The variety *lactea* is a very slender plant with ovate lance-shaped leaves, rounded or wedge-shaped at the base, and with narrow grey petals. *Persicæfolia* has long rootstocks with runners, leaves oblong lance-shaped, and white or lilac flowers with a very short spur. The variety *alba*, as the name indicates, has white flowers.

Culture &c. as above.

V. capillaris.—A Chilian species with many tufted, decumbent stems. Leaves ovate-oblong, blunt at the base, slightly acute at the apex, with glandular teeth on the margins. Flowers from May to August, pale blue, side petals densely bearded, spur short, blunt, greenish.

Culture &c. as above.

V. cornuta.—A tufted, fibrous-rooted, ornamental species, native of the Pyrenees and Switzerland. Leaves heart-shaped, ovate, crenate, ciliated, with obliquely heart-shaped, toothed, ciliated stipules. Flowers from May to July, pale blue; sepals and spur awl-shaped, the latter elongated and abrupt at the base. The variety *alba* has white flowers which look pretty nestling among the masses of deep green leaves.

Culture &c. as above. This species and its variety look pretty in masses in shaded parts of the rockery, or on banks or slopes, and although the flowers are odourless they are effective. Best increased by sowing seeds annually.

V. cucullata. — A very variable free flowering species with very scaly rootstocks, native of N. America. Leaves long-stalked, erect, more or less kidney- or heart-shaped, with a broad sinus, smooth or slightly downy, bluntly serrated. Flowers in early summer on scapes 3–10 in. high, deep or pale violet-blue or purple, sometimes almost white or variegated with white as in the variety called *variegata*; the side petals and often the lower ones bearded; spur short, thick. The variety *palmata* has leaves 3–7-parted or cleft, or the earlier ones entire on the same plant.

Culture &c. as above. Increased readily by dividing the roots early in autumn or in spring.

V. declinata.—A pretty Transylvanian Viola about 6 in. high with ovate and bluntly toothed leaves, and large flowers of a rich bright purple, with deeper markings near the yellow centre.

Culture &c. as above.

V. delphinifolia.—An interesting species, native of the Missourian prairies. Leaves pedately 7–9-parted, with narrow 2–3-cleft segments, reminding one of Larkspur foliage; stipules ovate lance-shaped, nearly entire. Flowers in spring, beautiful sky-blue, the 2 upper petals downy, the lower ones notched at the end; spur pouched, short.

Culture &c. as above.

V. hederacea (*Erpetion hederaceum; E. reniforme*). — A tufted Australian species, with roundish, kidney-shaped or spoon-shaped leaves, ½ to 1 in. broad, entire or toothed. Flowers in summer, blue, rarely white, small; petals smooth, or the side ones slightly downy inside; spur reduced to a slight concavity. The variety *grandiflora* is an improved form.

Culture &c. as above. This pretty species requires protection in winter. It should be propagated by cuttings in autumn, kept under glass in winter, and planted out at the end of May or beginning of June.

V. heterophylla. — A pretty alpine Violet with a dwarf compact habit. The leaves are narrowly lance-shaped and toothed, and of a bright green, while the large blue flowers are produced in great abundance in early summer.

Culture &c. as above.

V. hirta. — A tufted, hairy British plant, near *V. odorata* but with narrower and more triangular leaves, with deeper crenatures, and a shallower sinus. Flowers from April to June, faintly scented or not; spur long and hooked. The variety *calcarea* is a dwarf starved form with narrower petals.

Culture &c. as above.

V. lanceolata.—A N. American species with a creeping rootstock, and lance-shaped, blunt, erect leaves tapering into long, margined stalks. Flowers in early spring, white, small; petals beardless, the lower ones veined with lilac.

Culture &c. as above.

V. montana.—A simple-stemmed, erect species 1 ft. high, native of Europe, Siberia &c. Lower leaves heart-shaped, upper ones ovate, acute, stalks margined; stipules oblong toothed or incised. Flowers from May to July, white, becoming bluish; spur conical, straight, greenish; stigma papillose, slightly reflexed. The variety *Ruppii* has heart-shaped or lance-shaped leaves and procumbent stems.

Culture &c. as above.

V. munbyana. — A pretty free-flowering, vigorous species, native of Algiers. Leaves ovate-heart-shaped, bluntly crenate, smooth or slightly hairy on the edges. Flowers from February to May, and also during the autumn months in favourable seasons, large, violet or yellow, produced well above the foliage; spur straight, nearly twice as long as calyx. The variety *lutea* has yellow flowers which are faintly striped with purple at the base.

Culture &c. as above. Although a perennial it is on the whole better to treat this species and its variety as a biennial, by raising seeds annually as recommended above.

V. odorata (*Sweet Violet*). — This well-known plant is wild in British copses and banks, and is also distributed over Europe, N. Africa, N. and W. Asia to the Himalayas. Rootstock short, scarred, with long runners. Leaves deeply heart-shaped at the base, sinus closed; stipules glandular; stalks with deflexed hairs. Flowers from March to May, sweet-scented, blue, white, or reddish-purple; the side petals with or without a tuft of hairs; spur short, blunt. Anther-spurs linear oblong.

The dwarf and distinct variety *alba* has white flowers; *pallida plena* (the Neapolitan or Parma Violet) very sweet-scented, double, pale lavender flowers; *permixta* (probably a hybrid with *V. hirta*) pale, scentless flowers, runners not rooting; and *sepincola* (also probably a hybrid) flowers dark, scentless, plant more hairy, with rooting runners. *Sulphurea* is a new variety of Sweet Violet, with shining deep green leaves, and lemon-yellow flowers, with a deeper yellow shade in the centre, and a pale violet spur behind. There are many garden varieties, among which the following are best known: — *argentæflora*, purplish-white, fragrant; *Comte Brazza*, white, double, sweet-scented; *Czar*, very large, single, blue and fragrant; *White Czar*, a fine white form of the preceding; *Admiral Avellan*; *La Grosse Bleue*; *California*; *Princess of Wales*; *Belle de Chatenay*, strong double white or rose-white; *La France*; *Luxonne*, strong, beautiful, paler than the *Czar* but larger, much grown in the S. of France; *Lady Hume Campbell*; *Marie Louise*, lavender blue and white, very large, sweet-scented and free-flowering; *Queen of Violets*, double white, flushed pink; *Victoria Regina*, large double blue, sweet-scented; *Russian*, an old free-growing large single blue variety; *Wellsiana*; *Wilson*; *La Violette des Quatre Saisons*, flowers throughout the autumn, winter and spring, and is a great favourite with Parisians.

Culture and Propagation. — In the open border Sweet Violets delight in a rich and fairly heavy soil. They require a little shelter, and the best and most natural is that given by the surrounding plants, among which the air circulates freely. Away from brick walls, and on banks at the base of a hedge, facing north or north-west, is perhaps the best place for violets. Failing such natural positions the plants will of course do well in the ordinary flat border, not facing due south.

During the summer months a mulching of short rotten manure or the remnants of spent mushroom beds is beneficial. It not only prevents the moisture in the soil from evaporating too quickly, but also stifles the weeds, if any. A gentle watering in the cool of the summer evening is also most refreshing to the plants.

If the plants are too much crowded, or in too hot a position, they are liable to be attacked in the first case by green-fly, and in the second by red-spider. Both these pests, however, may be kept at bay by frequent use of the syringe, using clean hot water (say 80°–120° F.). Dusting with fine sulphur is a good remedy, but it makes the plants very unsightly.

Forcing Sweet Violets.—Where cold frames exist in any garden, Sweet Violets may with advantage be grown in them for flowering during the winter and early spring. The plants should be lifted about the end of September from the open ground and planted in rich soil in the frames, with the foliage as near the glass as possible. The plants should be thoroughly watered in, and kept close, that is, no air, or very little, should be admitted for about a week or ten days after planting, so that the roots may more quickly take a hold of the new soil. After this and throughout the winter, on favourable days, plenty of air may be given, and the lights may even be removed altogether on mild sunny days. Winter fogs are very injurious to both leaves and flowers, the former damping off, the latter remaining undeveloped.

Most of the varieties named above are suitable for growing in frames, but Marie Louise, Comte Brazza, and the Neapolitan (or Parma) Violets are the best.

Sweet Violets are easily increased by simply dividing the crowns after flowering, and planting about 9 in. apart in rich soil, in a somewhat shaded place. Fine flowering plants may also be obtained from seed, which should be sown as soon as ripe, or during the spring months as recommended above for the species in general, p. 228.

V. palustris.—A native of the swamps and bogs in Great Britain and Ireland, chiefly in the northern parts. Rootstock white scaly, creeping. Leaves kidney- or heart-shaped, slightly crenate, with gland-like stipules. Flowers from April to July, ½ in. across, white or lilac, scentless; side petals almost smooth; spur short, blunt.

Culture &c. as above for the species in general, p. 228.

V. pedata (*V. flabellifolia; V. flabellata*).—*Bird's Foot Violet.*—A beautiful N. American species with a thick rootstock. Leaves pedately divided, something like a bird's foot, with linear lance-shaped leaflets, entire or deeply 3-toothed at apex, sometimes very narrow and much cut; stipules ciliated. Flowers in May and June, usually bright blue, sometimes pale or white, large; petals smooth; spur very short; stigma large and thick, margined, obliquely truncate.

The variety *atropurpurea* has incised, wedge-shaped leaf segments, dark purple flowers and a downy pistil. *Bicolor* is a rare and handsome variety, with the 2 upper petals deep velvety violet. It does not grow equally well in all places, and requires special care. The form called *alba* has white flowers.

Culture &c. as above for the species in general, p. 228.

V. pedunculata.—A Californian species with rhomboid-ovate leaves about 1 in. long, rather thick, coarsely and bluntly toothed, and abruptly narrowed at the base. Flowers in spring, large, deep yellow; petals broadly obovate, the 2 upper ones conspicuously clawed, the side ones bearded at the base; spur very short.

Culture &c. as above for the species in general, p. 228.

V. pinnata. — A species from the mountains of S. Europe and Siberia. Leaves deeply divided into 4 or 5 segments, each 3-parted or pinnatifid, jagged and very narrow. Flowers in early summer, pale blue, with darker veins, the 2 side-petals bearded; sepals ovate; spur broad, nearly straight.

Culture &c. as above, p. 228.

V. præmorsa. — A North American species, usually densely hairy, with short erect stems. Leaves ovate lance-shaped, repandly toothed or almost entire; stipules entire. Flowers in spring, rather large, yellow; lower petal veined with brown, emarginate; spur very short.

Culture &c. as above, p. 228.

V. pubescens.—A softly downy species 6–12 in. high, native of N. America. Stems simple erect, naked below, 2–4 leaved above. Leaves broadly heart-shaped, toothed, somewhat pointed;

stipules large, ovate, entire or serrated at the top. Flowers in spring and early summer, yellow, lower petal streaked with purple; sepals oblong lance-shaped; spur very short; stigma with 2 tufts of hair.

The variety *eriocarpa* is much taller, stouter growing, and more downy than the species, and has woolly seed pods.

Culture &c. as above.

V. **pyrolæfolia.**—A Patagonian species, with ovate or more or less heart-shaped leaves, with stipules fringed at the apex. Flowers in winter (January), yellow; petals densely bearded within; sepals pointed; spur short, blunt.

Culture &c. as above.

V. **rostrata.**—A native of N. America, 4–6 in. high, with roundish heart-shaped, serrate leaves, upper ones acute; stipules large, lance-shaped, fringed, toothed. Flowers in early summer, dingy purple or lavender, with darker streaks. Petals smooth; spur slender, rather acute, ½ in. long.

Culture &c. as above.

V. **rothomagensis.** — A free-growing hairy species, native of Belgium, France, and Sicily, with rather spindle-shaped roots, and zigzag branching stems. Leaves ovate, the lower ones somewhat heart-shaped, crenate, fringed, stipules pinnatifid, rather lyrate; flowers from April to August, bright blue, the side petals and lip striped with black; spur tubular, blunt, shorter than the sepals; bracts near the flower, lance-shaped, with a tooth on each side.

Culture &c. as above. This species requires a warm, sheltered position. It is sometimes called the Rouen Violet, and is best raised from seeds sown annually as recommended above.

V. **rotundifolia.**—An American species with a creeping rootstock. Leaves shining, roundish ovate, heart-shaped, slightly crenate, increasing from 1 in. broad at flowering time to 3 or 4 inches. Flowers in early spring, yellow; side petals bearded and lined with brown; spur very short.

Culture &c. as above.

V. **sagittata** (*V. dentata*).— A smooth or hairy species from N. America. Leaves with small and margined or naked stalks, varying from oblong heart-shaped to hastate, sagittate, oblong lance-shaped, or ovate, toothed. Flowers in spring and early summer, rather large, purplish-blue; usually the side, but sometimes all the petals, bearded; spur short and thick; stigma bearded. The variety *emarginata* has almost triangular leaves, lacerate-toothed near the base; petals emarginate or with 2 teeth.

Culture &c. as above.

V. **Selkirki** (*V. umbrosa*).—A small delicate fibrous-rooted species, native of North America. Leaves roundly heart-shaped, crenate, with a deep, narrow sinus, and minutely hairy above. Flowers in spring and early summer, pale violet; spur very large, nearly as long as petals, thickened at the end.

Culture &c. as above.

V. **striata.**—A North American species with ascending angular stems, 6–12 in. high. Leaves heart-shaped, finely serrated, often acute; stipules large, oblong lance-shaped, fringed with strong teeth. Flowers from April to October, cream-coloured or white; side petals bearded, the lower ones lined with purple; spur rather thick, much shorter than the petals; stigma beaked.

Culture &c. as above.

V. **suavis** (*Russian Violet*).—A native of Tauria, with long creeping and rooting stolons. Leaves downy, kidney- or heart-shaped, crenate. Flowers from March to May, pale blue, white at the base, sweet-scented; sepals blunt; four upper petals narrowest, the lower one emarginate, the 2 side ones with a hairy line; stigma hooked, naked.

Culture &c. as above.

V. **sylvestris** (*Wood Violet*).—A native of the copses and woods of Britain. Rootstock very short. Plant smooth with leaves in a rosette, broadly ovate heart-shaped, stipules lance-shaped acute, fimbriate or toothed. Flowers from March to July, bluish-purple or lilac; base of sepals much produced in fruit; spur short, broad, compressed, furrowed, usually pale. The variety *reichenbachiana* has flowers smaller, paler and earlier; spurs longer, fruiting sepals scarcely produced. The variety *riviniana* has the lower leaves as broad as long; the upper ones a little narrower than long. Flowers later in summer than the type, bluish-purple or lilac, scentless; petals obovate oblong, the lowest much broader than the others; flower-stalks long, with 2 small bracts. There is also a variety having pure white flowers (*alba*), and another rarely seen with rose-coloured ones (*rubra*).

Culture &c. as above. Easily increased by seeds or division of the roots.

V. tricolor (*Heartsease* and *Pansy*). This is the wild plant from which the well-known Heartsease and Pansy are supposed to have originated, although some believe that these popular flowers are descended from *V. altaica*. The wild Pansy is a native of the pastures, banks and waste places in the British Islands, and is also found in such diverse places as Arctic Europe, N. Africa, N. and W. Asia to Siberia and N.W. India. Stems 4–8 in. high, branched, erect or ascending, angled, flexuous. Leaves, with long stalks, ovate oblong or lance-shaped, crenate, 1–1½ in. long, lyrate, coarsely and remotely crenate-serrate; stipules very large, pinnatifid; lobes spreading like a fan, linear or oblong obtuse, the middle one largest. Flowers from May to September, ½–1½ in. across, with purple, whitish, or golden-yellow petals, sometimes particoloured; spur thick, blunt; stigma capitate, hollowed. The variety *arvensis* has white or yellowish flowers, petals usually shorter than the sepals; *Curtisi* has a branching rootstock, with runners, and blue, purple, or yellow flowers, with spreading petals; and *lutea* (known as the Mountain Vine) has a branched rootstock, short stem with underground runners, and blue, purple, or yellow flowers, with spreading petals much longer than the sepals.

Culture &c. as below.

HYBRID PANSIES

The natural species and its varieties are utterly eclipsed by the vast number of beautiful forms which have been raised from them by British and Continental gardeners. Among the numerous cultivated varieties are many in which the flowers have only one—or almost one colour, chiefly white, yellow, rose, copper, violet, blue in various shades, chestnut, purple, intense velvety black &c. Others, and more numerous, have various colours on white or yellow grounds; others again have copper, old gold, or bronzy flowers with various shades. Then there are veined, striped, blotched, variegated, flamed, bordered and zoned flowers, washed and shaded with various colours in all sorts of ways, sometimes giving the flowers a most singular appearance. Indeed the range and combination of colour in Pansies is truly infinite, and where seedlings are raised regularly every year, new combinations, colours, and developments take place.

Pansies have come under the arbitrary rule of the florist, and he has divided them into three main sections as follows:—

(1) *English or Show Varieties.*—These are subdivided into white grounds, yellow grounds, and selfs. The flowers of 'white ground' Pansies have a large dense, dark blotch in the centre, with a ring or band of white, cream or straw colour around it, and this ring may be edged with blue, or various shades of purple. In the 'yellow grounds,' the ring is a pale or deep gold colour edged with various shades of bronze, maroon &c. The 'selfs' must be clear decided colours, of one shade, and should have a dark well-defined blotch under the eye or centre.

(2) *Belgian or Fancy Varieties.*—These are usually very large and richly coloured, and should have a deep coloured blotch covering almost the whole of the bottom petal or lip and contiguous parts of the side petals. The remaining portion of the flower may be any of the numerous shades referred to, but should always be so pale that the colour of the lower petal is much denser and decidedly conspicuous in comparison.

(3) *Tufted Pansies* is the modern name, and certainly an appropriate one, for Bedding Pansies and Violas, and many simply call them Violas—a pretty name. They are hybrids between *V. cornuta* and various garden-pansies, *V. cornuta* being the seed bearer. If the reverse cross is made, a more or less ordinary Pansy will result.

Violas or Tufted Pansies generally have a dwarf, close, bushy habit, and beautiful flowers—usually self-coloured—much smaller than the ordinary Pansy. In beds by themselves, or associated with other plants as a kind of floral carpet, Violas make a charming picture.

Culture and Propagation.—Pansies germinate readily from seeds, and may be sown in the open border or in shallow pans or boxes in July and August, in rich sandy soil with plenty of leaf mould in it. In the open border the seedlings may be thinned to about 6 in. apart, and by the end of September they will be large and strong enough to transfer to the positions in which they are required to bloom the following spring. From a packet of choice mixed seed, plants with the most gorgeous flowers may be obtained, and if there are any particularly fine, it will be easy to perpetuate them by means of cuttings. To obtain a good supply of these, the plant may have its branches pegged down, and as quickly as the shoots are produced they may be detached.

Cuttings may also be inserted in July and August, and by the first week in October the plants will be ready for their permanent positions.

Provided the plants are grown in a rich sandy loam, well-manured, Pansies and Violas are the easiest of plants to grow. Some thousands of Pansies and Violas are sold every spring in the London markets neatly bound in hay enclosing a ball of soil round the roots. The regular trade done rather indicates that all—or at least the majority—of the plants thus sold perish during the year. The reason probably is that Pansies and Violas do not really care to be disturbed in spring, just about the period when the flowers are draining the plant of its reserve material for the production of seeds. The flowers trying to carry out the natural laws of seeding, and the injured roots trying to re-establish themselves, the plant as a whole becomes more or less exhausted, and naturally succumbs in due course.

Pansies and Violas for Spring Bedding.—Too much importance can scarcely be attached to these charming plants for decorating flower-beds and borders during the spring and early summer months, and right up till the autumn even. If the very best results are required Pansies and Violas should be planted about the end of September, or as soon as ever the beds and borders have been cleared of the usual stock of summer bedding plants. The soil should be well dug and manured, and if light or heavy should be improved according to the recommendations given at p. 63 in the chapter on Soils. Whole beds may be planted with a variety of one colour alone, or two or three distinct varieties and colours may be used in an agreeable combination. The best contrasts are obtained by the juxtaposition of the primary colours, such as reds, blues, and yellows, and when intermediate shades are used care should be taken so that one colour has an effect upon another. For example, yellow looks colder with blue than with red, but blue is more effective with yellow than with white, and so on. As a rule the section known as 'Violas' or 'Tufted Pansies' are most effective for bedding purposes, and the colours chosen should always be clear and well defined, not 'washy' or indefinite, as if one colour had run into another before it had got dry.

The following is a list of some of the best Pansies and Violas arranged in the three main shades of colour, but any one can probably raise equally as good from choice seeds. There are many intermediate shades of colour, but as a rule the varieties with clear and well-defined self or uniform colours look best for bedding purposes.

WHITE-FLOWERED VIOLAS

Accushla, *Blanche*, *Countess of Hopetoun*, *Countess of Wharncliffe*, *Dr. Sculthorpe*, *Marchioness*, *Mary Scott*, *Mary Stuart*, *Niphetos*, *President*, *Sylvia*.

YELLOW-FLOWERED VIOLAS

A. J. Rowberry, *Ardwell Gem*, *Bullion*, *Duchess of Fife*, *Fanny Emmeline*, *George Lord*, *Golden Bee*, *Golden Boy*, *Goldfinch*, *Henry IV.*, *Kitty Hay*, *Kitty Whitworth*, *Lemon Queen*, *Lord Elcho*, *Molly Pope*, *Mrs. Greenwood*, *Nellie M. Brown*, *Pembroke*, *Renown*, *Sir Robert Peel*, *Wonder*.

BLUE AND PURPLE-FLOWERED VIOLAS

Acme, *Blue Gown*, *Border Witch*, *Britannia*, *Commander*, *Councillor W. Waters*, *Dorothy Tennant*, *Ethelinde*, *J. B. Riding*, *John Shires*, *Magnificent*, *Mrs. Grant*, *Mrs. H. Bellamy*, *Olivetta*, *The Mearns*, *William Haig*.

V. variegata. — A native of Dahuria, with rather hard subdivided roots. Leaves heart-shaped-ovate or roundish, violaceous beneath, obscurely green above, white at the veins, and rather hairy; stipules lance-shaped, toothed. Flowers in May and June, pale violet; spur cylindrical, straight, as long as the sepals.

Culture &c. as above, p. 228.

HYMENANTHERA.—A genus containing about 4 species of rigid shrubs on small trees, with alternate, sometimes clustered, often small, entire or toothed leaves without stipules. Flowers axillary, small, sometimes polygamous, solitary or in clusters.

H. crassifolia.—An ornamental shrub 2–4 ft. high, native of New Zealand, somewhat resembling a white-berried Cotoneaster when in fruit. Leaves alternate or tufted, linear spoon-shaped, entire, about ½ in. long. Flowers about March, yellowish, small, followed by masses of white shining berries, ¼ in. long, oblong obtuse.

Culture and Propagation.—This is the only species of any note in cultivation. It flourishes in a mixture of sandy peat and loam, and may be increased by cuttings put in sandy soil under a bell glass during the late summer months and protected until the following spring.

The plant is quite hardy as far north as Cheshire, and perhaps still further north. It is not only an excellent plant for the garden, but is also remarkable for its shrubby habit, so unlike what is usually associated with its relatives, the Pansies and Violas.

XV. BIXINEÆ

Trees or shrubs with alternate, simple, toothed, or more rarely entire leathery leaves, often marked with transparent dots. Stipules caducous or none. Flower stalks axillary, many-flowered. Flowers regular, hermaphrodite or unisexual. Sepals 2–6, often 4–5, slightly cohering at the base. Petals none or equal in number to the sepals, or numerous, and imbricate or contorted in bud, deciduous. Stamens hypogynous, of the same number as the petals, or some multiple of them, dehiscing by a pore at the apex. Ovary 1- or more celled, with several more or less distinct stigmas. Fruit either fleshy and indehiscent, or capsular, with 4 or 5 valves, the centre filled with a thin pulp. Seeds numerous.

This order contains about 160 species, mostly natives of warm regions and not hardy enough for our climate. The following are the only representatives grown out of doors in the British Isles.

AZARA.—A genus of about 12 species of ornamental evergreen trees or shrubs, with entire or serrate leaves, often with conspicuous stipules. Flowers hermaphrodite, borne in clusters, or shortly corymbose or almost spicate. Sepals 4, subvalvate, or 5–6 imbricated. Petals none. Stamens numerous (except in *A. microphylla*).

Culture and Propagation.—The Azaras thrive in well-drained, rich, sandy loam, and may be increased from cuttings of the ripened shoots placed in sandy soil under a glass and in gentle bottom heat in late summer and autumn.

In the southern counties and the milder parts of Ireland and Scotland the Azaras are hardy, but in more unfavourable parts protection may be required in severe winters. Trained against walls with a southern aspect, or grown as bushes, they are ornamental. All the plants are natives of Chili, and those described below are hardy against south walls in sheltered situations near London.

A. dentata.—A shrub 12 ft. high, with ovate, serrate, roughish leaves, woolly beneath; stipules leafy, unequal in size. Flowers in June, yellow, in few-flowered sessile corymbs.

Culture &c. as above.

A. Gilliesi.—A beautiful shrub 15 ft. high, with reddish-tinted branches and large, smooth, ovate, coarsely toothed leaves, like Holly. Flowers in autumn, bright yellow, in axillary densely packed panicles.

Culture &c. as above.

A. integrifolia.—About 18 ft. high, with obovate or oblong, entire, smooth leaves; stipules equal, persistent. Flowers in autumn, yellow, fragrant, on short axillary spikes. There is a rare variegated form.

Culture &c. as above.

A. microphylla.—An ornamental shrub 12 ft. high, with small obovate obtuse, dark shining green leaves, in opposite rows up the stem. Flowers in autumn, greenish, corymbose, followed by numerous small orange-coloured berries.

Culture &c. as above. This is probably the best known species.

IDESIA.—A genus with only one species, the description of which is given below with the generic characters.

I. polycarpa (*Flacourtia japonica*).—An ornamental tree native of China and Japan, where it assumes very large proportions, but is much smaller in cultivation. It has large and rather heart-shaped 5-nerved alternate leaves with serrated margins, and long racemes of rather large yellowish flowers borne in long drooping racemes at the ends of the branches. The male flowers are borne on one plant, the females on another. There are 5 (or 3-6) woolly sepals, no petals, and numerous stamens with shaggy filaments. The stamens are replaced by staminodes in the female flowers, in the centre of which are 5 (or 3-6) spreading styles. The fruit is a many-seeded orange-yellow berry about the size of a pea.

There is a variety called *crispa* rarely seen, and now perhaps not in cultivation, remarkable for its curiously cut and crisped leaves.

Culture and Propagation.—This tree is fairly hardy in the neighbourhood of London, in warm sheltered situations, and thrives in ordinary good garden soil, which must as a matter of course be well-drained. It may be increased by inserting cuttings of the more or less ripened shoots in sandy soil during the summer and autumn months, and placing them in gentle heat under glass. Seeds, if obtainable, may be sown as soon as ripe or in spring in light rich soil, and placed in bottom heat.

XVI. PITTOSPOREÆ

A small order of usually smooth shrubs or small trees with alternate, entire, toothed, or very rarely incised leaves, without stipules. Flowers hermaphrodite, regular, or slightly oblique. Sepals 5, usually distinct. Petals 5, hypogynous, longer than the sepals. Stamens 5, hypogynous, free, alternating with the petals. Fruit a capsule or berry.

PITTOSPORUM.—A genus of usually smooth and evergreen shrubs or small trees with entire or sinuate-toothed leaves, often more or less whorled near the ends of the branches. Flowers borne in various ways in clusters at the ends or sides of the branches. Sepals distinct or united at the base. Petals more or less cohering in a tube, or rarely spreading. Ovary sessile or shortly stalked. Fruit a roundish, ovoid, or pear-shaped capsule.

Culture and Propagation.—Although about 50 species have been described in this genus, those mentioned below are the only ones suitable for cultivation in the open air in the milder parts of the British Islands. They are fairly hardy in ordinary winters in the neighbourhood of London, and on the west and south coast even *P. Tobira* has been uninjured by 20° of frost.

Pittosporums will thrive in any good and well-drained garden soil, but they prefer a rich fibrous loam with a little sand and leaf mould added. They may be increased during the summer months by means of cuttings of the half-ripened shoots inserted in light sandy soil under a handlight or bell glass, and placed in gentle bottom heat. The plants thus raised may be grown on under glass until they are large enough and thoroughly hardened off to stand being planted out of doors, an operation best performed during mild weather in spring.

P. crassifolium (*P. Ralphi*).—An ornamental bush 4-10 ft. high, native of New Zealand, where it is known as the 'Parchment Bark.' The branches are clothed with rather narrowly oblong obovate light green leaves, quite smooth and shining above, but rather woolly beneath. The deep brownish-purple flowers are produced in abundance in early summer in stalked and nodding umbels.

Culture &c. as above.

P. Tobira (*P. chinense*). — A pretty Japanese shrub 10-12 ft. high, with bluntly obovate smooth leathery leaves, and clusters of white sweetly scented flowers produced during the summer months.

Culture &c. as above.

P. undulatum.—An ornamental Australian shrub 6–10 ft. high with oval lance-shaped, wavy, deep green, and rather leathery leaves, tapering at both ends. The small white flowers appear in early summer in somewhat downy clusters.

Culture &c. as above.

BURSARIA. — A small genus of stiffish and rather spiny shrubs, with small entire leaves often in clusters. Flowers small, whitish, in pyramidal panicles at the ends of the branches. Sepals minute, distinct. Petals narrow, spreading almost from the base.

B. spinosa (*Itea spinosa*).—An ornamental evergreen spiny shrub 6–10 ft. high, native of Australia, with small and entire oblong wedge-shaped leaves and trusses of small white flowers produced during the summer and autumn months in favourable situations.

Culture and Propagation.—Although fairly hardy in warm and sheltered situations in the vicinity of London, this plant is much more luxuriant in the milder south and western parts of the kingdom. It thrives in good and well-drained garden soil, but has a preference for rich loam and peat or leaf soil in about equal proportions. Cuttings of the young or half-ripened shoots may be rooted in gentle heat under glass in the same way as *Pittosporums* above, p. 236.

XVII. POLYGALEÆ—Milkwort Order

Erect or climbing herbs or shrubs with alternate, rarely opposite, simple entire leaves, always destitute of stipules. Flowers hermaphrodite, irregular, usually in spikes or racemes, often small and inconspicuous but showy in many species of Polygala. Two to three small bracts are at the base of the pedicels. Sepals 5, free, the 2 inner larger and petal-like and known as the 'wings.' Petals 3 or 5, hypogynous, of which one known as the 'keel' is larger than the others. Stamens 8, rarely 5 or 4, hypogynous, with filaments united in a split sheath, which is usually adnate to the petals. Ovary free, 2-celled (rarely 3–5-celled). Fruit usually opening through the valves; sometimes indehiscent, membranous, fleshy, leathery, drupe-like or winged.

There are about 400 species in this order, distributed throughout temperate and warm regions.

POLYGALA (MILKSEED; MILKWORT).—An extensive genus containing about 200 species, of which only those mentioned below are worth growing out of doors, although there are many pretty species suitable for greenhouse cultivation. There are 3 species native of Britain.

The Polygalas are chiefly shrubs or undershrubs, or herbs, with alternate, or rarely opposite, or verticillate leaves. Flowers pea-like in appearance, in terminal or lateral racemes, rarely axillary, sometimes in contracted heads, rarely paniculate. Flowers sometimes showy, sometimes minute, variously coloured. Sepals 5, unequal, the 2 inner ones large, petal-like, forming wings. Petals 3, coherent. Stamens 8, with filaments united.

Culture and Propagation. — The species described below are chiefly useful for rockeries, and thrive in fibrous peat and sandy loam mixed, in a somewhat shaded place. They are increased from seeds, or by cuttings struck under glass. The seeds may be sown as soon as ripe in cold frames, protecting the seedlings afterwards under glass until the following spring. Or the seeds may be sown in spring in the same way, and the seedlings grown on singly in pots until the following spring before transferring them to the outdoor garden.

P. Chamæbuxus (*Bastard Box*).—A pretty creeping shrub 6 in. high, found wild in the mountain woods of Austria and Switzerland. Leaves oblong lance-shaped, with a point at the apex. Flowers in early summer, creamy or yellow, tipped with purple, fragrant, in axillary few-flowered racemes. The variety *purpurea* is a much prettier plant, with bright magenta-purple flowers, clear yellow in the centre.

Culture &c. as above.

P. paucifolia. — A North American herbaceous perennial 3 in. high, with simple erect stems, naked below, and ovate leaves. Flowers from May to August of a fine rosy-purple colour, sometimes white, large, in threes; keel crested.

Culture &c. as above.

P. Senega (*Seneca Snake Root*).—Also native of N. America, 6-12 in. high, with lance-shaped or oblong, rough-margined leaves. Flowers in May and June, almost sessile; wings roundish obovate, concave; crest short.

Culture &c. as above.

XVIII. FRANKENIACEÆ—Sea Heath Order

An order with only one genus (Frankenia) consisting of perennial herbs or much-branched undershrubs with jointed nodes. The leaves are opposite, small, without stipules, and the usually pink flowers are regular and hermaphrodite, being sessile in the division of the branches, and terminal, embosomed in the leaves. Sepals 4–6, united in a furrowed tube. Petals alternate with the sepals, hypogynous, clawed, often with appendages at the base of the limb. Stamens, 6, sometimes 4, 5, or numerous, hypogynous, free, or slightly connate at the base. Ovary 1-celled, many-seeded. Fruit 2-, 3-, or 4-valved, enclosed by the calyx.

This order contains about 30 species chiefly natives of Northern Africa and Southern Europe, although a few are indigenous to South Africa, New Holland, and temperate Asia.

FRANKENIA lævis (*Sea Heath*).—This is a small creeping evergreen with pubescent stems and wiry branches having oblong linear leaves with reflexed margins, and small rose-coloured flowers which appear in July and August. It is found wild on our southern sea coasts and the Channel Islands, and may be used in the rock garden.

Culture and Propagation.—This species will thrive in ordinary garden soil, and may be used in sunny and rather dry positions. It is most readily increased by dividing the rootstocks in early autumn or in spring. Seeds may also be sown in cold frames as soon as ripe, or in the open border in April and May, but they are more easily attended to if sown in boxes or pans in a cold frame or greenhouse.

XIX. CARYOPHYLLEÆ—Carnation, Clove, and Pink Order

A large order containing from 800 to 1,200 species, natives chiefly of the cold and temperate parts of the world. Annual or perennial herbs, rarely shrubby, branches usually thickened, and sometimes jointed, at the nodes. Leaves always opposite and entire, often connate at the base, often 1–3-nerved; stipules none, or if any small and scarious. Flowers hermaphrodite, rarely unisexual by abortion. Sepals 4–5, persistent, distinct or cohering in a tube. Petals 4–5, hypogynous or slightly perigynous, entire, or frequently split into 2 parts, sometimes minute, scale-like, or absent. Stamens (8–10) usually twice as many as the petals, in two circles, of which the inner is often wanting; filaments awl-shaped. Fruit a 2–5-valved capsule with numerous seeds. Placenta free, central.

DIANTHUS.—This is the genus to which Carnations, Pinks, and Sweet Williams belong botanically. At one time as many as 200 species were described under it, but this number has been reduced to about 70 by Bentham and Hooker.

They are chiefly perennial, occasionally sub-shrubby herbs, with narrow grassy-like glaucous leaves. Flowers terminal, solitary, panicled, or clustered, often rose or purple, rarely white or yellow. Calyx tubular, 5-toothed, with imbricating bracts at the base. Petals 5, with long claws, the blade entire, many-toothed or cut, or notched in two, hairy or smooth above, or with claws produced into scales. Stamens 10, capsule cylindrical-oblong, rarely ovoid, opening by 4 teeth or valves.

The following are some of the best kinds in cultivation out of doors. Their culture and propagation are the same as those of the Carnation (*Dianthus Caryophyllus*), the Pink (*D. plumarius*) and the Sweet William (*D. barbatus*), under each of which instructions will be found.

D. alpestris.—A native of the Alpine pastures of Europe, 6-9 in. high, with linear-lanceolate leaves. Flowers in July, red, usually in pairs; petals emarginate.

Culture &c. the same as for *D. cæsius* below, as well as notes for each species.

D. alpinus.—Native of the Austrian Alps, 3-4 in. high. Leaves oblong-linear, blunt, green. Flowers in summer, large, deep rose spotted with crimson, solitary, and very freely produced; petals crenated.

Culture &c. the same as for *D. cæsius* below.

D. arenarius.—Native of N. Europe. Flowers in summer, white, with a livid spot and purple hairs at the base of the deeply divided petals.

Culture &c. the same as for *D. cæsius* below.

D. atrorubens.—A species 1 ft. high, native of S. and E. Europe, with 3-nerved linear leaves. Flowers in summer, dark-red, small, sessile, in clusters, with an awned involucre.

Culture &c. the same as for *D. cæsius* below.

D. barbatus (*Sweet William*).—The type of the well-known Sweet William is a native of S. and E. Europe, 1-2 ft. high, with lance-shaped nerved leaves. Flowers in summer, variously coloured, from dark purple to white, in dense heads; petals bearded.

There are almost innumerable varieties or forms of the Sweet William, and of late years they have been much improved from the florist's point of view. The individual flowers are larger, more circular in shape, thicker petalled, and have the colours more clearly defined. In what is called the 'Auricula-eyed' section, the flowers have a clear white centre surrounded by red, purple, or some other deep, rich colour. There is also a section in which the teeth of the petals are almost if not quite obliterated, being called 'smooth-edged.' 'Self-coloured' flowers exist also, being either pure white, pink or crimson. But there are a vast number of pretty flowers variously edged, spotted, mottled &c., which remain. There is a double dwarf variety called *magnificus*, with deep velvety crimson flowers, but the other double kinds are not particularly desirable. The forms known as *fulgens*, *nigricans*, *candidus*, *oculatus*, *marginatus*, and *nanus* are all handsome, and their peculiar features are expressed in the names.

Culture and Propagation.—Sweet Williams are easily raised from seeds sown in the open border or in cold frames as soon as ripe, or in spring about March and April. The seedlings may be pricked out when about 2 in. high into light rich soil, and may be transplanted either in early autumn or spring in mild showery weather, according to the period at which the seeds were sown.

Where plants are once established in a garden any number of self-sown seeds will come up every year. By thinning out or transplanting into good soil six inches apart about the end of September, the plants will become well-established for the winter and will flower freely the following summer. Special varieties may be increased by cuttings taken in early summer, and inserted in rich sandy soil in a shaded place. Transplant in September to the flowering positions. The plants may also be divided in September, but Sweet Williams being better treated as biennials, neither this mode of propagation nor cuttings is much practised, except when it is desired to keep some particularly fine variety quite true.

D. bicolor.—A native of S. Russia, 1-2 ft. high, with awl-shaped leaves, the lower ones woolly. Flowers in summer, white above, lead-coloured beneath; petals dilated.

Culture &c. as for the next species *D. cæsius.*

D. cæsius (*Cheddar Pink*).—A very glaucous species 3-6 in. high, native of

Britain (the limestone rocks of Cheddar). Leaves of the barren shoots linear, blunt, the upper ones of the flowering stems acute. Flowers in June and July, 1 in. across, fragrant, delicate rose; petals obovate, crenate, downy.

Culture and Propagation. — The Cheddar Pink is a beautiful plant for making a carpet at the edge of the flower border, or may be used in masses in the rockery. It likes a rich sandy soil and a warm sheltered position to appear at its best. It ripens seeds freely, and these may be sown in the same way as described above for Sweet Williams (*D. barbatus*). It is, however, much easier to increase the plants simply by dividing them during mild showery weather, either in early autumn or in spring. Once established the plants need not be disturbed for three or four years unless they exhibit signs of weakness. Besides seeds and division most of the perennial species of Dianthus may also be increased by cuttings and layers in the same way as stated for Carnations, p. 242.

D. callizonus. — A beautiful alpine Pink, native of Transylvania, with a dense tufted habit and lance-shaped pointed blue-green leaves. It flowers profusely during the summer months; the rich rosy-purple blossoms are 1½–2 in. across, with a distinct deep purple zone in the centre, and scarcely overtop the bed of blue-green foliage, but rather nestle amongst it.

Culture and Propagation.—This plant does not apparently seed freely in the British Islands, although it is perfectly hardy. It may, however, be easily increased by division in autumn or spring, like *D. cæsius*, and also by means of cuttings placed in sandy soil. It is an excellent rock plant.

D. Caryophyllus (*Carnation; Clove; Pink*).—The Wild Carnation is naturalised here and there on old castle walls in England, and is also distributed all over Central and E. Europe. It is a stout glaucous smooth perennial, much branched and leafy below, 18–24 in. high. Leaves 4–6 in. long, linear awl-shaped, grooved above. Flowers in summer, 1½ in. across, fragrant, nearly every colour except blue, but rosy in the type; petals broadly obovate, toothed and crenate.

CARNATIONS

The Carnation, like the Rose, has for several centuries been a favourite garden plant, and careful selection and cultivation by generations of gardeners through these long years have produced flowers so beautiful in shape, and so diversified in colour, that one can hardly imagine them to be descended from such a simple plant as *D. Caryophyllus* described above.

Carnations are divided into three main groups by florists, viz.:—*Bizarres* (subdivided into crimson, pink, and purple, and scarlet-flowered); *Flakes* (subdivided into purple, rose, and scarlet); and *Selfs*, which as the name indicates have flowers of a uniform colour of any shade throughout.

The *Bizarres* are variously coloured or spotted or striped, with two or three distinct colours on a clear ground. The *Flakes* have a pure ground flaked with one colour only the entire length of the petals.

PICOTEES

Besides the Carnations proper, there is also a very important and beautiful class known as *Picotees*. These are easily distinguished by having a ground colour, the petals being edged with a distinct and striking colour. This edging may be either 'heavy' or 'light,' and serves to separate Picotees into two sections, in each of which the edges may be either purple, red, or rose; in addition to which are the 'Yellow ground' Picotees, a vigorous class in which the flowers are various shades of yellow, buff and apricot, sometimes marked on the edges, or with lines radiating from centre to edge.

What are known as 'Tree or Perpetual' Carnations are usually grown under glass for flowering in winter in pots. They do not therefore come within the scope of this work.

In the olden days, there was also a section known as 'Painted Ladies,' in which the under side of the petals was white, and the upper side red or purple, as if painted on the white. This class has practically disappeared from cultivation altogether, but the National Carnation and Picotee Society may endeavour to revive it some day.

The characteristics of a good Carnation or Picotee flower may be said to consist of a circular outline, with smooth and rounded edges, regularity in size and shape of the petals, and a calyx which does not split. Where a tendency to burst the tubular calyx exists, a thin piece of raffia or worsted may be carefully and not too tightly tied round it, so that the flower can open freely. It may be mentioned that there are many Carnations —like the Tree section and others—which have fringed or toothed petals, many of them very beautiful.

Culture and Propagation. — This is precisely the same as detailed for Carnations below.

Marguerite Carnations.—A new and distinct race remarkable for the rapidity with which they produce their flowers after sowing the seed. About 70 or 80 per cent. of the flowers (which are beautifully fringed and of many charming shades) come double. Seeds, if sown in gentle heat in early spring, will produce flowers out of doors by July or August. Or better still the seeds may be sown in cold frames about August and September, and after the seedlings have been pricked out once, they may be grown in the cold frames until the following April and May, when they may be planted out in mild weather. The plants should have as much light and air as possible during the winter months on all favourable occasions. They are very useful for room decoration, in a cut state.

'Jacks.' — This peculiar name is applied to the large and vigorous growing Carnations which are grown in hundreds of thousands annually, chiefly to supply the great trade done in them by costermongers. There is no doubt whatever that nearly 100 per cent. of the amateurs who buy these plants do so in the belief that they are obtaining some very choice double-flowered kinds, such as they see in florists' windows or in other amateurs' gardens. These 'Jacks' are mostly single-flowered Carnations, raised from seeds in spring, and afterwards planted out and grown on until the following spring. They are then taken up for sale, and as they are apparently remarkably cheap, they find a ready sale among cottagers and the uninitiated. As a rule, however, the purchasers are disappointed when the plants bloom, owing to the prevalence of single flowers among them.

CULTIVATION

Although there are naturally many ailures in Carnation growing, the plants are not really difficult to grow. The failures usually result from too much coddling and shifting about, and never allowing the plants to have a fair chance. Of course where plants have been accustomed to the protection of frames during the winter, and grown in pots, they are not nearly so hardy and vigorous as those grown without any protection, and what is worse, they are not so well able to ward off or withstand the attacks of insect and fungoid pests. Of late years great efforts have been made to secure a really hardy race of Carnations, for the flower garden, and there are now a large number of varieties which will grow without any protection in winter in almost any part of the British Isles. Where, however, any one does not wish to run risks with extra fine varieties whose actual hardiness has not been tested by experience, it may be well to give some slight shelter; but the hardiness or otherwise should be tested as soon as a plant can be easily spared for the experiment.

Soil.—The best soil for Carnations is a rich loamy one, with plenty of leaf soil, and a portion of well-rotted stable manure, and enough coarse sand to keep it open. Light hot soils are quite unsuitable for Carnations, and should be well enriched with leaf soil, farmyard and other vegetable manure with a view to making it cooler and more retentive of moisture. Soil should always be well dug some time before planting except in cases where the plants succeed a totally distinct crop.

Manure. — This should never be applied in a fresh state, and certainly not to the roots when planting. It is best applied in a rotten state and as a mulch on top of the soil in spring. Soot is an excellent fertiliser; it tends to give the foliage a fine 'bloom,' and is also more or less obnoxious to slugs, snails &c. Various artificial manures, such as nitrate of soda and sulphate of ammonia, are also beneficial, but their use is attended with great risk—the inclination for a beginner being to give an overdose which would probably kill the plants. If given at all, these are best in a liquid form, say a teaspoonful to a gallon or two of water.

Planting and Layering.—Late planting is responsible for many deaths during the winter. In Scotland planting should be finished by the first or second week of September, and practically about the same period in England and Ireland. In order to be able to do this the layers should also have been made at a period correspondingly early—say the first and second weeks of July—thus giving them about 3 full months to become established plants.

The benefits of layering and planting early are obvious. The plants are well leaved and their roots well established in the soil before winter sets in. They are thus in a position to resist the frost; they bloom earlier in spring, and the chances are that the flowers are not only finer, but in much greater abundance than from later planted specimens.

An important point to remember in connection with planting is not to insert the plants too deeply in the soil. Spread out the roots carefully and cover them firmly, but do not bury the stems beyond half an inch or so. If in rows, the plants should be about 9 in. apart, with at least a foot between the rows, to allow of hoeing &c. in spring.

Staking.—Each plant should be provided with a stake about 3 ft. high at time of planting, and the stems should be neatly tied, so that they do not chafe when blown about by the wind. Attention to staking is essential, otherwise the branches and blooms will straggle about in the dirt, and be more or less worthless.

Position.—Perhaps the most natural and ornamental way to dispose of Carnations is to plant them in groups, large or small according to the space available. They are thus seen to better advantage when in bloom, and it is easier to notice their general peculiarities, than if planted here and there in isolated specimens. Where possible the plants should be so placed as to be sheltered from the north and east, and fully exposed to the west, and more or less partially shaded from the summer sun when facing south. About 9 in. to 12 in. apart will not be too crowded for the plants.

PROPAGATION

Carnations are increased by seeds, layers, and cuttings—the latter being known as 'pipings.'

Seeds are usually sown in April and May in pots or shallow pans. The soil should be rather finely sifted, and composed of loam, leaf soil and silver sand. It is best to carefully place the seeds about ½ in. apart, slightly cover them with soil, and place in a cold frame after watering with a fine-rosed can. When about 6 leaves have developed, the seedlings may be pricked out round the edges of a pot or in a shallow box, about 2 in. apart in a similar compost. As soon as the plants are 3–4 in. high, they may be pricked out into beds or borders, about 4 in. apart, and by the first week of September they should be fine sturdy plants fit for removing to their flowering positions. It should be borne in mind that Carnations from seed are liable to vary a good deal, and that many of the flowers will be single, and others poor in quality. Still there is a possibility of a really fine variety appearing among them, in which case it should be carefully labelled and kept for stock.

Layering is perhaps the most common method of increasing Carnations and Picotees. As stated above, layers should be made by the first and second week of July with a view to getting strong established plants before winter. A fresh compost like that in which the seeds are sown should be placed round the base of each plant, about 2 in. deep. The leaves of the lower portion of each shoot to be layered should be stripped off, leaving about 3 or 4 leafy joints above. A slit should then be made lengthwise with a sharp knife, just below a joint which is neither too woody nor too tender or sappy, taking care not to sever the shoot from the plant, but about halfway through, so as to form a tongue. The shoot thus cut should then be carefully pegged down with a piece of bracken stem, or a hair-pin, in such a way that the cut is left open and the tongue is firmly fixed in the soil. A little more compost should then be placed over the pegged portion of the shoot. When every branch has been treated in the same way, the soil should then be well watered, using a fine-rosed can, and in a month or so the layers will be rooted. By the first or second week of September they may be severed and transplanted. The sketch at p. 59 will show at a glance the way in which the shoot of a Carnation or Picotee may be layered.

Pipings or Cuttings.—Carnations increased by this method are never quite so good as those from layers, but it is employed in the case of rare or special kinds to obtain stock more quickly, or when the shoots are too short and numerous for layering. The pipings should be taken with a 'heel' or cut off at a joint which is fairly well ripened, but not woody. They should then be firmly inserted in a fine sandy compost, well watered, and placed in a close and shaded frame, for 3 or 4 weeks, after which they may receive plenty of air, and will be ready for transplanting at the season recommended.

In the case of layers and cuttings, the tops of the outer leaves are often snipped off with the knife. It is then easy to see when new leaves are forming, as of course their tips will not be mutilated. The thin lines across the leaves in the sketch show how the tips are cut off.

Thinning the buds.—With the exception of those who make a business of exhibiting Carnations for prizes, the practice of removing some of the flower buds is seldom or never practised. By reducing the number of flowers to each stem, and even by cutting out a whole flower stem now and again, the flowers left will certainly be much finer and fuller when developed.

DISEASES

When Carnations are continuously grown on the same soil, or on cold heavy land, or too closely together, they become more or less subject to various diseases. And some varieties which thrive in the south are miserable failures in the north, and *vice versâ*.

The Carnation Rust (*Uromyces Caryophilinus*) appears on the stem or leaf as a pale raised pustule, over which the epidermis soon breaks, hanging round the edges in a ragged state, revealing the brown powdery reproductive spores of the fungus. These may be blown or washed from plant to plant, spreading the disease rapidly, when in a proper state for germinating. It may be checked by finely spraying with sulphide of potassium, dissolving one ounce to 10 gallons of water.

Leaf spot is a troublesome disease often caused by a damp atmosphere or over-crowding. It appears on the leaves and stems as a more or less circular purplish spot with a whitish centre, the latter being often dotted with black by the fruiting portions of the fungus. The fungus enters the tissues of the plant rather deeply, and the spores which are produced in great abundance are rapidly distributed by wind and water. It does not, however, attack all varieties with equal virulence. The plants may be dusted with a mixture of soot and sulphur, or sprayed with sulphide of potassium as recommended for rust. *Gout* is a disease which attacks the stems close to the ground, and is supposed to be caused by 'eel-worms' which enter the plant to lay their eggs, out of which come other worms to feed upon the plant and kill it. Plants grown in too rich a soil, and making sappy growth, are more subject to attacks than others.

The *maggot* is a pest which often attacks Carnations. The eggs are laid in the tissues of the leaf, and the young insects eat their way down the main stem to the centre and kill the plant. The plants should be carefully watched, and the eggs destroyed between finger and thumb wherever discovered.

Spittle-fly is easily seen. It appears when the plants are in bud, and should be squeezed to death between the finger and thumb.

D. chinensis (*D. sinensis*).—*Chinese* or *Indian Pink.*—A Chinese biennial 6-12 in. high, with pale green lance-shaped leaves. Flowers in summer, usually reddish, but very variable in colour, either single or double, with toothed petals. Among the many forms of *D. chinensis*, the following may be noted as distinct:—*albus*, flowers double, white; *carneus*, flowers double, flesh-coloured; *fulgens*, flowers double, brilliant scarlet crimson; *nanus albus*, *n. atro-sanguineus*, and *n. flore pleno*, all dwarf forms; *laciniatus* is a fine Japanese form with very blue-green foliage and flowers about 2 in. across, remarkable for having the petals deeply incised or jagged almost half the length of the blade. The variety *Gardneri* is a native of China, it has very large flowers with finely cut petals. The variety *Atkinsoni* is a beautiful old-fashioned hybrid Pink, with deep blood-red flowers. It does not ripen seed, and is rather difficult to increase by division or cuttings. *D. Heddeweggi* is a beautiful annual or biennial with variously coloured flowers—single and double. Very useful for borders in summer. The forms of *Heddeweggi* known as *atropurpureus* and *diadematus flore pleno* are very distinct and worth a place in the flower border.

Culture and Propagation.—*D. chinensis* and its varieties may be treated as tender annuals or biennials. As annuals the seeds may be sown about March in gentle heat in light and rich well-drained soil. When about 2 in. high the young plants may be pricked out into other boxes about 2 in. apart, and grown on under glass until the end of May or beginning of June. In the meantime they must have plenty of light and air, and be gradually hardened off so as to be ready for the outdoor garden at the time stated. Besides sowing under glass, the seeds may also be sown in the open border in April and May in patches, where the plants are to bloom eventually. In this case the seedlings are to be thinned out about 6 to 8 in. apart, as if transplanted at that late period the plants will hardly come into bloom the same season, except in the south and west.

D. cinnabarinus. — A free-growing species, native of Greece, with tufts of linear leaves. The flowers appear in summer, and are a beautiful orange or cinnabar-red.

Culture &c. as for *D. deltoides.*

D. cruentus. — Native of E. Europe. Leaves linear lance-shaped, very acute, lower ones tufted. Flowers in summer, small, numerous, blood-red, scarlet; petals toothed, bearded near base with scattered reddish-violet hairs.

Culture &c. as for *D. deltoides.*

D. deltoides (*Maiden Pink*).—A much branched British perennial 6–9 in. high. Leaves narrow lance-shaped, downy, the lower ones blunt. Flowers from June to September, ¾ in. across, rarely 2 together, rose-coloured, with a dark circle spotted with white, or white in the variety *albus.* Calyx smooth, strongly ribbed.

Culture and Propagation. — The Maiden Pink is excellent for carpeting borders and rockeries with its dense masses of leaves and flowers. It likes a rich sandy soil and a warm sheltered position to appear at its best. It ripens seeds freely, and these may be sown in the same way as described above for Sweet Williams (*D. barbatus*). It is, however, much easier to increase the plants simply by dividing them during mild showery weather, either in early autumn or in spring. Once established, the plants need not be disturbed for three or four years unless they exhibit signs of weakness. Besides seeds and division most of the perennial species of Dianthus may also be increased by cuttings and layers in the same way as stated for Carnations.

D. dentosus (*Amoor Pink*).—A native of S. Russia, 6 in. high. Leaves rather broadly linear, sometimes slightly wavy, glaucous, tinged with a reddish hue, especially in autumn. Flowers in summer, violet-lilac, more than 1 in. across, with a regular dark spot formed of purple streaks at the base of each petal, producing a dark eye in the centre. Petals toothed at the edge, bearded at the base.

Culture &c. as for *D. deltoides.* The Amoor Pink seems to have crossed readily with some of the other species, as there are now several varieties of it in cultivation, some with double or semi-double flowers, all larger than those of the type. These double-flowered forms are mostly sterile and do not produce seed. They must, therefore, be increased by division.

D. fimbriatus.—Native of Spain, 1 ft. high, with awl-shaped, roughish leaves. Flowers in summer, rosy, solitary. Petals oblong, multifidly toothed, beardless, somewhat like those of *D. superbus.*

Culture &c. as for *D. superbus* below.

D. Fischeri.—A somewhat rare Russian species 7–10 in. high, with stiff lance-shaped serrulated leaves. Flowers in summer, light rose, with petals much cut or feathered at the edge, almost beardless at the base.

Culture &c. as above for *D. deltoides.*

D. fragrans.—Native of the Caucasus, 6–9 in. high, with awl-shaped, rough-edged leaves. Flowers from July to September, white, fragrant, suffused with purple. Petals somewhat cut, beardless.

Culture &c. as above for *D. deltoides.*

D. Freyni.—A beautiful perennial of garden origin, forming dense masses or cushions of foliage, and producing in early summer, and often again in autumn, bright rosy-carmine flowers, about ¾ in. across, sitting close to the grassy foliage, the entire plant being not more than 2 in. high altogether.

Culture &c. as above. This pretty little plant is apt to rot off at the ground if placed too low down. It does not spread by means of suckers like some other species, and is best propped up between two or three pieces of limestone rock, so that water will pass readily away from it. · As slugs are rather partial to it a watch must be kept for them.

D. fruticosus. — A shrubby-stemmed species 1-2 ft. high, native of the Grecian Archipelago. Leaves bluntly obovate lance-shaped. Flowers in summer, dark in the centre, rose at the edge, white and hairy at the base.

Culture &c. as above for *D. deltoides.*

D. gallicus.—Native of France, Spain and Portugal, about 6 in. high, with linear, somewhat ciliated leaves. Flowers in summer, white, dull purple at the base. Petals much cut and toothed.

Culture &c. as above for *D. deltoides.*

D. giganteus.—A native of E. Europe 2-4 ft. high, with long linear leaves connate at the base. Flowers in summer, purple, numerous, in hemispherical heads, supported by leafy bracts.

Culture &c. as above for *D. deltoides.*

D. glacialis (*Glacier Pink*).—A native of Central and S.W. Europe, 2-4 in. high, with short erect tufted stems, and linear acute serrulated green leaves. Flowers in summer, small, purple, scentless; petals toothed.

Culture &c. as above for *D. barbatus.* This species is best raised from seeds, as it often dies out when pulled to pieces. It does best in crevices in the rockery in peat soil, mixed with nodules of rock for support.

D. Holtzeri.—A fine species from Turkestan. Leaves linear lance-shaped. Flowers pink, about 1½ in. across; petals more or less fringed.

Culture and Propagation. — This comes very near *D. superbus*, and is probably only a variety of it. It requires the same treatment and may be increased like *D. superbus.* The following forms have been noted: *dentatus*, with sharply toothed petals; *ebarbatus*, with paler flowers than the type, and scarcely any hairs in the throat; *fimbriatus*, with fringed petals, and *flaccidus*, with weak decumbent stems and rosy-purple flowers.

D. Knappi.—A very distinct species about 1 ft. high, native of Eastern Europe. It is closely related to *D. liburnicus*, and has narrow lance-shaped leaves. The flowers appear in July and August and resemble those of a Sweet William. They are, however, remarkable for being of a clear primrose-yellow, and therefore singular and interesting among single-flowered Dianthuses.

Culture &c. as above for *D. deltoides.*

D. latifolius.—The native country of this species is unknown. It is about 1½ ft. high, with oblong lance-shaped leaves, and somewhat resembles the Sweet William in habit. Flowers in summer, pink, in clusters.

Culture &c. as for *D. chinensis* and *D. barbatus* above. The plant described here is possibly a variety of the Indian Pink or the Sweet William.

D. liburnicus (*D. Balbisi*).—A glaucous plant 1-2 ft. high, with angular stems, and lance-shaped linear leaves. Flowers in summer, red, almost sessile, in capitate clusters. Native of S. Europe.

Culture &c. as above for *D. deltoides.*

D. monspessulanus (*Montpelier Pink*). A native of S. and E. Europe, 6-12 in. high. Leaves linear, serrulate. Flowers in summer, red or white, solitary; petals digitately cut, smooth in the throat.

Culture &c. as above for *D. cæsius.*

D. neglectus.—A lovely alpine Pink, native of the Pyrenees, the high Alps of Dauphiny &c., and closely related to the Glacier Pink, *D. glacialis.* In its native state it only reaches a height of 1-3 in., but in cultivation often as much as 6-8 in. It has a strong sturdy habit, forming tufts of rather blue-green grassy foliage. The beautiful and brilliant deep rosy flowers, quite an inch across, appear in summer and have the petals attractively mitred or serrated at the edge, the backs of the petals being of a nankeen colour.

Culture and Propagation. — This species, if grown in sandy well-drained soil, even if rather poor, will stand almost any winter. It flowers very freely and is easily increased by division of the tufts or by means of seeds, which ripen in favourable seasons, and should be sown in cold frames at once, or even in the rockery under a sheet of glass.

D. pallidiflorus.—A Russian species 6 in. high, forming dense branching tufts. Leaves linear, pointed, flat, sessile. Flowers late in summer, purple-rose, numerous, solitary.

Culture &c. as above for *D. deltoides.*

D. petræus (*Rock Pink*). — Native of E. Europe, 1-6 in. high, with smooth awl-shaped, entire leaves. Flowers in summer, fine rose, numerous, usually solitary; petals beardless, cut at the edges. There is a pretty form with double flowers called *flore pleno*.

Culture &c. as above for *D. deltoides*.

D. plumarius (*Garden Pink; Pheasant's Eye*).—This is supposed to be the origin of all the Garden Pinks. It is a glaucous plant 9–12 in. high, native of Eastern Europe, and naturalised on old walls in various parts of England. Leaves linear, rough-edged. Flowers in summer, white, purple, either single or double, spotted or variegated; petals bearded, jagged. The variety called *serotinus* blooms somewhat later than the type, and *flore pleno* has double creamy-white flowers.

Garden Pinks have always been great favourites owing to the great freedom in which they produce their beautiful sweet-scented flowers, their dwarf, tufted habit, and their great hardiness, surpassing in this respect the Carnation.

Culture and Propagation. — Pinks may be propagated by exactly the same methods as recommended for Carnations, viz. by seeds, layers, and cuttings (pipings). The latter method is usually adopted, as many of the varieties are too short, close and tufted to readily admit of layers being made. The mode of procedure is the same as for Carnations (see p. 242).

In June or July, when the stems are fairly well ripened, cuttings, or 'pipings' will readily root in light sandy soil under handlights if placed in a cool and shaded part of the garden. When well rooted, the plants may be transferred to their flowering positions, but all planting should be finished by the end of September at least. If plants are moved much after October it is safer to winter them in cold frames, as they will not have had sufficient time to enable them to develop new roots and become established before the approach of winter.

Soil similar to that for Carnations is also best for Pinks. The latter, however, do not like too much moisture at the roots, and where possible the Pink beds or borders should be somewhat raised above the ordinary level. Top dressings of rotted manure, spent mushroom beds &c. are very beneficial in spring and summer, and water must not be lacking in the hot weather. Where particularly fine flowers are required, some of the blooms may be pinched off, leaving the most likely ones only to develop.

Pinks are usually divided into two classes, viz. *Show* or *Laced Pinks*, and *Border Pinks*. The latter are most suitable for outdoor cultivation, but are also forced a good deal in greenhouses for early bloom. The 'Show' or 'Laced' varieties are grown under glass especially for exhibition purposes. The following is a selection of the best Pinks for outdoor cultivation :—

WHITE-FLOWERED VARIETIES

Alba maxima, large border variety, fine for bouquets; *Albino*, an improvement upon *Snowflake*, almost like a Carnation, fine full flower; *Alice Lee*, *Carnation*, *Fairy King*, *Her Majesty*, pure white of exceptional size: in the opinion of some, the very best; *Mrs. Sinkins*, fine border variety, fine for bouquets; *Mrs. Welsh* and *Snowflake*, the latter a lovely variety with branching stems; it rarely bursts.

VARIOUS

Anne Boleyn, rose-purple; *Ascot*, pink; *Bertha*, white, rosy centre; *Boiard*, very large, white, bright red lacing; *Conqueror*, dark red, laced; *Empress of India*, white, laced purple; *Ernest*, red, broad lacing, large; *Ernest Ladhams*, light pink with deeper centre, flowers as large as a *Malmaison*; a fine novelty, wonderfully free; *John Ball*, dark plum-purple; *Lena*, rosy-purple; *Lorina*, pink; *Lowlander*, red; *Masterpiece*, purple-maroon; *Minnie*, bright red; *Modesty*, white, rose centre, evenly laced; *Mrs. Pettifer*, white, purple centre, heavily laced; *Professor*, red; *Sarah*, fine white, darky velvety red centre, perfect; *Vigilant*, red.

D. ramosissimus (*Bush Pink*). — A free-flowering species, 6 in. high, native of Tartary, with linear pointed leaves. Flowers in late summer, purple-rose, on wiry stems.

Culture &c. as above for *D. deltoides*.

D. Seguieri.—A native of S. and E. Europe, Asia &c., about 1 ft. high. Flowers in summer, rose-purple.

Culture and Propagation. — This comes very close to *D. dentosus*, and is probably only a variety of it. It may be grown under similar conditions and increased in the same way.

D. semperflorens. — This is the name given to a comparatively new race of Garden Pinks, supposed to be the result of a natural crossing between *D. Caryophyllus* and *D. chinensis*. They are very elegant in habit and flower profusely, the colours ranging from pure white to deep rose and carmine, the petals of some varieties being prettily striped and marked. The plants are branching in habit, and about 12–18 in. high, the stems being clothed with long lance-shaped leaves. The flowers are slightly fragrant and continue to appear until cut down by severe frosts. In a cut state they last a long time in water.

Culture and Propagation.—This race grows well in ordinary good garden soil, and the plants may be readily increased by dividing the roots in early autumn or spring. They may also be increased by means of cuttings in the same way as Carnations (see above, p. 241) at almost any season, but preferably about May and June.

D. squarrosus.—A species 6 in. high, native of S. Russia, with stiff, short, recurved, awl-shaped leaves, furrowed above. Flowers in summer, white, finely jagged at the edges.

Culture &c. as above for *D. deltoides.*

D. suavis (*Sweet Pink*).—The native country of this species is unknown. It grows about 6 in. high, and has linear. glaucous leaves. Flowers in summer, sweet-scented, pink, with bearded and deeply serrated petals.

Culture &c. as above for *D. deltoides.*

D. superbus (*Fringed Pink*).—A native of Europe and Asia, 9–18 in. high. Leaves bright green, linear lance-shaped, acute. Flowers in summer, rosy or reddish; petals divided beyond the middle, feathery, bearded at the base.

Culture and Propagation.—This charming and distinct species is not only remarkable for its beautifully fringed petals, but also for the sweet fragrance of its blossoms. Grown in masses in the rockery or flower border it makes a fine display during the summer months. It flourishes in ordinary good and well-drained garden soil, but prefers that of a rather light rich sandy and calcareous nature. It may be raised from seeds every year exactly in the same way as recommended for *D. chinensis* above.

D. virgineus.—A plant 6–12 in. high, native of S.W. Europe, with tufted, linear, serrulate, stiffish leaves. Flowers in summer, red, with crenated petals.

Culture &c. as above for *D. deltoides.*

TUNICA.—A genus containing about 10 species of graceful slender and somewhat rigid or wiry stemmed herbs, smaller than *Dianthus*, and having narrow leaves. Flowers like those of *Dianthus* but smaller, cymose-paniculate, collected into a close or rounded head. Calyx top-shaped, or elongate-tubular, bluntly 5-toothed, 5-15-nerved, usually with a pair of imbricating bracts at the base. Petals 5, long-clawed; blade retuse or emarginately bifid, without scales. Stamens 10. Torus small, or rarely produced on a short stalk. Ovary 1-celled; styles 2. Capsule ovoid or oblong, opening at the apex by 4 teeth or valves.

T. Saxifraga.—A small perennial 2–8 in. high, found wild in dry stony parts of the Alps and Pyrenees. Leaves narrow, linear, acute, roughish. Flowers in July, rose, freely produced in loose forked panicles. Seedling forms often exhibit a good deal of variation in colour, and the flowers also come double or semi-double.

Culture and Propagation.—This is the species generally met with in gardens. It will grow in poor soil almost anywhere, and is useful for the chinks and holes in old walls, ruins &c., or for the rock garden. It may be increased by carefully dividing the numerous wiry branches with their roots in spring. Indeed, this is the only sure way to retain the characteristics of any particularly fine seminal variation. Seeds, however, are freely produced, and may be sown out of doors in warm sheltered and well-drained places or in cold frames, as soon as ripe, if extra strong plants are desired for early summer flowering. Seeds may also be sown in gentle heat about March, afterwards pricking the seedlings out and growing on until the end of May, when they may be put out of doors. Or seeds may be sown in patches where the plants are to bloom, in April and May, afterwards thinning the plants out 6–9 in. apart. By sowing seeds at intervals in this way blooming is considerably extended.

DRYPIS.—This genus contains only the following species, a native of the Mediterranean region:—

D. spinosa.—A pretty little herbaceous perennial about 6 in. high, with very rigid 4-sided stems, and stiff awl-shaped spinescent leaves. Flowers in early summer, small, pink or white, in dense cymes, with spinescent bracteoles and calyx teeth. Calyx tubular, 5-toothed. many-nerved. Petals 5, narrowly clawed, blade bifid, without scales. Stamens 5. Torus small. Styles 3, rarely 2 or 4.

Culture and Propagation.—This plant is well suited for rockwork, and in sandy soil produces its pale pink or white flowers in great profusion. It is increased by cuttings put in sandy soil under a hand-glass, or by seed sown in spring—about March—in gentle heat. When the seedlings are large enough to handle, it is well to prick them out into their flowering positions as soon as the weather is favourable. They should be well watered until fairly established.

GYPSOPHILA.—A genus containing about 50 species of very graceful annual or perennial, usually glaucous and slightly glandulose, pubescent herbs, with flat or rarely needle-shaped leaves. Flowers usually small and numerous, panicled, calyx more or less tubular or bell-shaped, 5-toothed or 5-fid, broadly 5-nerved. Petals 5, narrow-clawed, with an entire or emarginate, scaleless blade. Torus small. Stamens 10. Styles 2, or very rarely 3. Capsule globose or ovoid, deeply 4-valved.

Culture and Propagation. — Gypsophilas thrive in ordinary garden soil, with which a little lime or brick rubbish may be mixed. They are easily increased from seeds, but the perennial kinds take quite a year to make good flowering plants. The annual kinds like *G. elegans* flower the same year—about June and July—if the seeds are sown out of doors about the beginning of April. The perennial species may also be increased by cuttings taken from the young side shoots in summer, or in autumn by dividing the rootstocks. All the Gypsophilas, however, are better increased from seed, and several sowings may be made out of doors of the annual kinds to keep up a supply of bloom.

G. arenaria. — A perennial species, native of Central Europe, in sandy, gravelly soil, about 1 ft. high, with rather fleshy, smooth, flat, linear leaves. Flowers in summer, pale red, in dense long corymbs; petals rarely notched.

Culture &c. as for *G. paniculata* below. Increased by seeds, cuttings, or division.

G. Arrosti. — A beautiful perennial 2½–3 ft. high, native of Asia Minor. Its light and graceful stems have fleshy grey-green lance-shaped leaves about 1¼ in. long, and the small white flowers appear in August in immense panicles when those of *G. paniculata* have disappeared.

Culture &c. as for *G. paniculata* below. This is a new species and well worth growing to follow on after *G. paniculata.*

G. cerastioides.—A Himalayan perennial over 3 ft. high, with erect 4-sided stems. Leaves hairy on both sides, with ciliated edges; lower leaves spoon-shaped, with long stalks, abruptly pointed. Flowers in early summer, white, red-veined; petals notched.

Culture &c. as for *G. paniculata* below. It is perfectly hardy and forms neat cushions of foliage.

G. elegans.—A charming Caucasian annual, 12–18 in. high, with slender much-branched knotted stems and opposite blue-green more or less linear lance-shaped leaves. The small, beautiful flowers, less than half an inch across, are pure white, sometimes faintly striped with violet or reddish-purple. They are borne during the summer and autumn in graceful forked panicles, which have a light and airy effect—a mass of white starry flowers over a blue-green ground.

The specific name is very appropriate, and *G. elegans* is highly valued for floral decorations. This species has recently been crossed with the perennial *G. paniculata*, and has produced an intermediate hybrid resembling *G. paniculata* in blossom, but *G. elegans* in habit.

Culture &c. as above. Raised from seeds sown two or three times annually in the open border.

G. fastigiata.—A European perennial about 1 ft. high, with rather fleshy, linear, smooth, flat leaves. Flowers in July, pale red, petals rarely notched.

Culture &c. as for *G. paniculata* below.

G. glauca.—A perennial about 18 in. high, native of the Caucasus, with downy, clammy branches, and rather fleshy, bluntly linear, lance-shaped leaves. Flowers in summer, white, in straggling panicles.

Culture &c. as for *G. paniculata* below.

G. paniculata.—A beautifully light and graceful perennial, forming a dense compact bush 2–3 ft. high, native of Europe. Stems much branched, knotty, smooth and glistening, very slender and fragile. Leaves linear, lance-shaped, opposite, without stalks. Flowers during the summer, small, white, very numerous, borne on stiffish threadlike stalks.

Culture and Propagation.—Although this species may be increased by dividing the thickish roots in spring, it is as a rule better to raise the plants from seeds. These may be sown thinly out of doors in April and May in a warm and not too sunny border with finely prepared soil. As soon as the plants are large enough to handle easily they may be pricked out into another bed, afterwards keeping them well watered and shaded until established. By the end of September, or in mild weather in spring, the young plants may be moved to their flowering positions in the flower border. They will not bloom so well the first and second year as afterwards, but once established they produce immense clouds of blossom annually, and are very valuable for cutting for bouquets, room decoration &c., either in masses by themselves or mixed with other flowers.

G. perfoliata.—A perennial 1½–3 ft. high, native of S.W. Europe. Leaves smooth, lance-shaped, acute, more or less stem-clasping. Flowers in summer, pink, in forked clammy panicles.

Culture &c. as for *G. paniculata.*

G. repens.—This is a pretty perennial species 3–6 in. high, native of the European Alps, with smooth linear leaves, and white or rose-coloured flowers from July to September, borne in 3-forked corymb-like clusters.

Culture &c. as above for *G. paniculata.* A very useful plant for the rockery.

G. scorzoneræfolia.—A Crimean perennial 1–3 ft. high. Leaves lance-shaped acute, more or less stem-clasping, 3–5-nerved and 3–4 in. long. Flowers from July to September, white, numerous, in slightly clammy panicles.

Culture &c. as above for *G. paniculata.*

G. Steveni.—A Caucasian perennial 1–2 ft. high, with linear lance-shaped, keeled, gray leaves, nearly all radical. Flowers from July to September, white, panicled; petals broadly linear, blunt, not notched.

Culture &c. as above for *G. paniculata.*

G. viscosa.—This pretty annual is a native of the East. It resembles *G. elegans* in height and appearance, and has been considered simply as a rosy-flowered form of that species. It differs, however, in having a more blue-green appearance and more knotted and leafy stems. The flowers are borne on shorter and more erect stalks, and are white flushed with rose, and slightly fragrant. There are other minor differences, among which may be mentioned the clamminess of the stems, and the somewhat broader and rather stem-clasping leaves.

Culture &c. as above for *G. elegans.*

SAPONARIA (Fuller's Herb; Soapwort).—A genus containing about 30 species, some of which are annual, with a habit like the *Gypsophilas*, and some perennial with growth like the *Silenes*. Calyx ovoid or oblong tubular, 5-toothed, obscurely nerved. Petals 5, narrow-clawed, with an entire or notched blade, scaly or not at the base. Stamens 10. Styles 2 or very rarely 3.

Culture and Propagation. — Saponarias grow well in sandy, loamy, well-drained soil and may be utilised in the rock garden, borders, edges of shrubberies, waste places, old banks &c. The perennial species are easily increased by seeds or by dividing the roots. The seeds of annual and biennial kinds should be sown in April and May in the places where the plants are to bloom, or earlier in the year on a hotbed or warm greenhouse, afterwards transferring the seedlings to the open air about the end of May.

S. cæspitosa.—A pretty alpine perennial 3–6 in. high, native of the Pyrenees. Leaves in dense tufts, smooth, rather thick, linear, rough at the edges, keeled behind. Flowers in summer, bright rose, somewhat umbellate; petals obovate, entire, with 2 awl-shaped scales at the throat.

Culture &c. as for *S. officinalis* below. This species makes a good carpeting beneath taller plants, but although it likes shade and shelter must not be suffocated with coarser plants.

S. calabrica.—A beautiful annual 6–12 in. high, native of Calabria, with erect, forked stems. Leaves obovate spoon-shaped, usually 1-nerved, smooth or slightly downy, with ciliated edges. Flowers in late summer, beautiful rose, with rounded petals, narrowed at the base, and borne on forked branches. The inflated reddish calyx is usually hidden by the upper leaves after flowering. There is a variety with white flowers, and a dwarf compact one with deep rose ones.

Culture and Propagation.—Seeds of this species and its varieties may be sown in gentle heat in March, afterwards pricking out the seedlings into shallow boxes, and growing them on under glass until the end of May, when they may be placed out of doors in masses, allowing about 6 in. apart each way between every plant. Seeds may also be sown out of doors in April and May where the plants are to bloom. When the seedlings are large enough, they may be thinned out about 6 in. apart as above. From the beginning to the end of September seeds may also be sown in the open border and the plants will survive an ordinary mild winter except in the bleakest parts of the kingdom. Plants raised from seeds sown at this period are much larger and bloom earlier the following year than those from spring-sown seeds.

S. glutinosa.—A biennial about 18 in. high, native of E. Europe, with ovate 3-nerved leaves. Flowers in summer, blood-red, with minute petals deeply notched at the apex and scales at the throat.

Culture &c. as above for *S. calabrica.*

S. lutea.—A pretty perennial 3–6 in. high, native of the Alps, with linear leaves ciliated at the base. Flowers from June to August, yellow, in heads; calyx woolly, with short lobes; petals obovate, entire; stamens more or less violet-coloured.

Culture &c. as for *S. officinalis* below.

S. ocymoides (*Rock Soapwort*). — A lovely trailing perennial native of S. and Central Europe, forming dense tufts 6–12 in. high, with forked branches. Leaves ovate lance-shaped, usually 1-nerved. Flowers from May to August, red or pink, in panicled clusters; calyx purple, cylindrical, hairy, and somewhat clammy.

The variety *splendens* has larger and more deeply coloured rosy flowers than the type, and is very effective used as an edging to taller plants, or in masses in the rock garden.

Culture &c. the same as for *S. officinalis.*

S. officinalis (*Bouncing Bet; Common Soapwort*).—A stout, vigorous and showy perennial 1–2 ft. high, native of Europe, Asia, and N. America, and also found in Britain in hedges, roadsides, fields &c. Leaves smooth, glaucous, oblong lance-shaped, 3–4 in. long, 3-nerved. Flowers in August and September, lilac or white, 1 in. across, with obcordate petals. *S. hybrida* is a variety with connate upper leaves, and a gamopetalous corolla. The variety *puberula* has the upper part of the stem and the calyx downy. There is also a double-flowered variety (*flore pleno*) with rather pale blossoms like a small Carnation.

Culture &c.—This species and its varieties, although perennial, may be raised annually from seeds in the same way as recommended for *S. calabrica* above. The double-flowered form, however, which rarely seeds, must be increased by dividing the roots in early autumn or in spring. The single-flowered forms may also be increased by division at the same period.

S. Vaccaria (*Cowherb*).—An annual 1–2 ft. high, native of Central Europe and occasionally found in British cornfields. Leaves ovate lance-shaped, without stalks. Flowers in July and August, red, paniculate; calyx smooth, 5-angled.

Culture &c. as above for *S. calabrica.*

SILENE (Catchfly; Campion).—A large genus containing according to Bentham and Hooker about 200 more or less distinct species, although as many as 400 have been described by other authors. They are annuals or perennials with erect, tufted, decumbent or diffuse-climbing stems with opposite entire leaves. Flowers solitary or rarely in cymes, often in one-sided spikes forming a terminal cluster or panicle. Calyx variously inflated, ovoid, bell-shaped, club-shaped, or tubular, 5-toothed or 5-cleft, usually 10-nerved. Petals 5, narrow-clawed, with an entire 2-cleft or rarely laciniated blade, often with 2 scales at the base. Stamens 10. Styles usually 3. Capsule opening at the apex by 6 (rarely 3) teeth or valves.

Culture and Propagation. — Silenes grow in almost any light loamy soil, and many of the dwarfer kinds are very useful as rock-garden plants, while the taller kinds may find a place in the ordinary flower border. The perennial species may be increased by seeds, by cuttings, or division of the root. The annual kinds, such as *S. pendula* and its variety *compacta*, are best from seeds sown late in summer. If transplanted not later than the end of September, they make good strong plants for spring flowering.

S. acaulis (*Cushion Pink*).—A very dwarf alpine herb tufted into light green masses like a wide-spreading moss, but quite firm. Native of the mountains of Scotland, Ireland, North Wales, the Lake district of England, and many other parts of Europe; found also in Asia and America. Leaves short, linear, smooth, crowded. Flowers in summer, pink, rose or crimson, on short stalks barely peeping above the leaves; petals obovate, slightly notched; calyx bell-shaped or tubular, quite smooth, with rather blunt teeth. *Alba* is a variety with white flowers; *exscapa*, with the flower-stems shorter than in the usual form; and *muscoides*, dwarfer still; but none of them are far removed from the common plant.

Culture and Propagation. — The Cushion Pink, as the popular name implies, is a charming little plant for making green carpets in the border or rock garden. It likes a well-drained soil composed of sandy loam, peat, and leaf soil, and also a partially shaded situation.

Seeds may be sown as soon as ripe in shaded parts of the border or in cold frames in pots or pans. The seedlings are pricked out when large enough, and are best wintered in cold frames in the bleakest parts of the kingdom. They may be planted out in mild weather in spring in such localities, but in warmer situations they will stand an ordinary winter if planted in September. The plants when well established in clumps may also be divided in September or in spring.

S. alpestris (*Alpine Catchfly*). — A dwarf and beautiful alpine herb, about 6 in. high, native of the Alps. Leaves linear-lance-shaped, bluntish, tufted, smooth, erect; stem simple, few-leaved. Flowers in early summer, white, shining, rather large, panicled; petals 4-toothed; calyx erect, with blunt teeth, as long as the petals. Some varieties of this species are quite sticky from viscid matter, and others perfectly free from it.

Culture &c. as above for *S. acaulis.*

S. Armeria (*Sweet William Catchfly*). A smooth annual 12–18 in. high, native of France and Switzerland, with ovate-lance-shaped blue-green leaves rather heart-shaped at the base, borne on erect, knotty, forked stems which are somewhat clammy near the top. Flowers from July to September, pink, in corymbose panicles. The variety *alba* is readily distinguished by its white flowers, and there is another form with flesh-coloured blossoms.

Culture and Propagation. — The Sweet William Catchfly is a very ornamental border plant and grows well in almost any soil, so long as it is well drained and fairly sandy.

Seeds may be sown as soon as ripe in spots where the plants are to bloom, and the seedlings may be thinned out about 6 in. apart, in preference to pricking them out or transplanting. In cold parts of the kingdom it is advisable to sow the seeds in cold frames, and transplant the seedlings in spring. Seeds may also be sown in April and May out of doors in the same way as recommended for autumn.

S. Atocion. — A downy-stemmed annual 6–12 in. high, native of the Levant. Leaves roundish obovate, lower ones long-stalked, the uppermost ones sessile. Flowers in summer, pink, in more or less erect three-forked panicles. Petals obcordate, blunt, with a sharp tooth on each side at the base, crowned with 2 protuberances.

Culture &c. as above for *S. Armeria.* Increased by seeds.

S. chloræfolia.—A smooth-stemmed Armenian perennial 1–2 ft. high, with elliptic pointed leaves, the upper ones rather heart-shaped. Flowers in August and September, large, white, becoming reddish with age; calyx long, striped; petals cleft half way down with a 2-lobed crest.

Culture &c. as above for *S. acaulis.* Increased by seeds or division.

S. compacta. — A smooth, glaucous biennial about 18 in. high, native of Russia. Leaves ovate heart-shaped, without stalks, the two large ones beneath the flowers appearing almost connate. Flowers in summer, pink, or deep rose, crowded into dense corymbs; petals obovate, entire.

Culture and Propagation.—This is one of the most beautiful members of the genus. It must be grown in a rich well-drained soil, as it cannot stand the wet and cold of winter. It must not however be grown in a soil that is too light and inclined to be dry, but rather in one with plenty of humus or decayed vegetable matter. In fairly mild parts of the kingdom seeds may be sown out of doors in autumn as soon as ripe, or in spring, in the same way as recommended for *S. Armeria.* In cold northern parts they are best sown in cold frames either in autumn or spring, afterwards moving the plants outside in mild weather in spring.

S. Elisabethæ.—A beautiful perennial 3–9 in. high, native of the Tyrolese mountains, with downy and clammy stems and leaves, the latter being 2–3 in. long, lance-shaped, acute. Flowers rather late in summer, 1½ in. across, bright rose, the bases or claws of the wedge-shaped notched petals being white.

Culture &c. as above for *S. acaulis.* Increased by seeds or division. This species should be grown in a warm corner of the rockery, in deep soil composed of well-drained peat and loam.

S. fimbriata.—A downy perennial 2–4 ft. high, native of the Caucasus. Leaves large, ovate lance-shaped, wavy, on long stalks. Flowers from May to August, white, in large spreading panicles; petals fringed.

Culture &c. as above for *S. acaulis.* Increased by seeds or division.

S. Hookeri.—A Californian perennial with decumbent stems. Leaves downy, 2–3 in. long, the lower ones elliptic-spoon-shaped, narrowed into long stalks, the upper ones elliptic-lance-shaped, acute or pointed. Flowers in early summer, over 2 in. across, pink; petals variously lobed.

Culture &c. as above for *S. acaulis.* It requires a warm sheltered place in the rock garden and flourishes in rich sandy loam, peat and leaf soil.

S. inflata (*S. Cucubalus*). — This glaucous, smooth or downy perennial, 2–3 ft. high, is a native of the roadsides and waste places of Britain, and is popularly known as the Bladder Campion or Catchfly, Cow Bell, White Ben, White Bottle. Leaves 1–3 in. long, ovate, obovate, or oblong. Flowers from June to August, ¾ in. across, drooping, white, some having stamens only, some pistils only, others both; petals deeply cleft; calyx bladdery, net-veined. The variety *puberula* is a rarer form with downy leaves.

Culture &c. as above for *S. acaulis.* Increased by seeds or division.

S. lacera.—A procumbent hairy biennial, native of the Caucasus, with long-stalked, ovate-lance-shaped, wavy leaves. Flowers from May to August, white with jagged petals, and a much inflated calyx.

Culture &c. as above for *S. compacta.* Increased by seeds sown in early autumn or spring.

S. laciniata.—A downy perennial 3–4 ft. high, native of Mexico and California, with large lance-shaped, acute leaves. Flowers in summer, large, terminal, rather drooping, crimson, with a white, two-parted crest; calyx cylindrical. inflated; petals more or less 4-cleft.

Culture &c. as above for *S. acaulis.* Increased by seeds or division. This plant should be grown in the warmest part of the garden.

S. livida.—A flexuous, downy perennial 1 ft. high, native of Carniola, with oblong lance-shaped leaves. Flowers in summer, white above, purplish-green beneath, panicled, drooping to one side; petals 2-cleft, with scales.

Culture &c. as above for *S. acaulis.* Increased by seeds or division.

S. maritima. — A perennial species, native of British and W. European sea coasts, very similar in growth to the Bladder Campion, *S. inflata.* It has a blue-green appearance, the numerous stems being clothed with thickish oblong acute leaves, the edges of which are furnished with small spiny teeth. Flowers from June to August, white, larger than those of *S. inflata* and remarkable for the conspicuous blue anthers of the stamens; petals shortly cleft, the segments broad, with 2 scales at the base. The variety *flore pleno* has handsome double flowers rising slightly above the tufts of sea-green leaves.

Culture &c. as above for *S. acaulis.* The double-flowered variety can only be increased by dividing the roots or stems in spring.

S. monachorum. — A pretty Bosnian species very much resembling *S. quadrifida* in appearance. Its slender green stems, however, are furnished with shorter, narrower, and blunter leaves, about ¾ in. long. The flowers are white and appear from June onwards. They have wedge-shaped petals with 4 blunt teeth, and resemble those of *S. alpestris*, *S. quadridentata*, and *S. quadrifida*.

Culture &c. as above for *S. acaulis*.

S. noctiflora.—An erect, soft, downy annual 1–2 ft. high native of sandy places in the British Isles. Leaves 3–4 in. long, oblong lance-shaped, acute, the lower ones stalked. Flowers in summer, erect, open at night, fragrant. Petals rosy within, yellow outside; calyx cylindrical, with 10 green nerves.

Culture &c. as above for *S. Armeria*. Increased by sowing seeds annually as soon as ripe, or in spring out of doors.

S. nutans (*S. paradoxa*).—*Nottingham Catchfly*.—A downy perennial with a woody rootstock, native of dry places, walls &c. in Britain and the Channel Islands. Stems 2–3 ft. high, clammy above. Lower leaves oblong lance-shaped, 2–5 in. long, tufted, stalked, the upper ones small, narrow, without stalks. Flowers from May to July, dimorphic, opening and fragrant for 3 nights, 5 stamens ripening on each of the two first nights, the styles protruding on the third. Calyx tubular, swollen in the middle. Petals white or pink, drooping.

Culture &c. as above for *S. acaulis*. Increased by seed or division.

S. orientalis.—A beautiful perennial about 2 ft. high, native of Eastern Europe. Leaves glaucous, ovate, pointed. Flowers in summer, deep rose, in dense umbel-like heads 3 in. across.

Culture &c. as above for *S. acaulis*. Increased by seeds or division.

S. pendula.—A downy trailing annual, native of Italy and Sicily, with ovate-lance-shaped leaves. Flowers in spring and summer, flesh-coloured, pendulous; calyx swollen, petals cleft. There are many varieties of this species, the best known being *compacta*, very dwarf, densely tufted, covered with beautiful pink flowers in spring; *compacta alba*, with white flowers; 'Empress of India,' 'Snow King,' 'Double Pink,' *ruberrima* and *ruberrima Bonnetti*, and 'Zulu King' (double) are other forms worth growing.

Culture and Propagation.—This Silene and its varieties grow 6–9 in. high, and are very popular for spring bedding, especially as they soon make fine tufts, and produce their pretty flowers in great abundance. Seeds may be sown as soon as ripe in some spare part of the garden, and as soon as the beds and borders are cleared of the usual summer bedding plants, they may be filled with the young Silenes. It is better to get them planted at least before the middle of October, and not later than the middle of September for northern parts of the kingdom, as otherwise they will be unable to establish themselves before the frosty weather sets in. By planting early, good strong tufty plants will be obtained for flowering profusely in spring. For flowering during the summer months seeds may be sown in the open border in patches in April and May, afterwards thinning the seedlings out 6–9 in. apart.

S. pennsylvanica (*American Wild Pink*).—A beautiful downy N. American perennial 4–8 in. high. Lower leaves narrowly spoon-shaped, nearly smooth, tapering into hairy stalks; upper ones lance-shaped. Flowers in early summer, pink, clustered; petals wedge-shaped, slightly notched and jagged-edged.

Culture &c. as above for *S. acaulis*. Increased by seeds and division.

S. picta.—A pretty rush-like annual 1–2 ft. high, native of Asia Minor and Syria, with much-branched slightly downy stems. Lower leaves obovate spoon-shaped; upper ones linear, acute. Flowers in summer, pink, loosely panicled; calyx striped, and petals veined with red.

Culture &c. as above for *S. pendula*. Increased by seeds.

S. pumilio (*Pigmy Catchfly*).—A beautiful densely tufted perennial, 2–3 in. high, native of the Tyrol. Leaves shining green, linear or spoon-shaped, somewhat fleshy and blunt, and slightly downy. Flowers in summer, rosy, about an inch above the leaves; calyx swollen, hairy, many-nerved; petals obcordate.

Culture &c. as above for *S. acaulis*. Increased by seeds or division.

S. pusilla.—A charming little plant, closely related to *S. quadrifida*. It has mossy foliage, and the white flowers are produced throughout the summer months on stalks 2–4 in. high.

Culture &c. as above for *S. acaulis*. It flourishes in moist sandy loam with a little mortar rubbish in half-shady places in the rock garden. When it finds a favourable spot it reproduces itself readily from self-sown seed.

S. quadridentata. — A species closely related to *S. alpestris*. It grows 4–6 in. high, and forms dense masses of green linear oblanceolate leaves about 1½ in. long. The flowers are freely produced in summer—from June onwards—in loose panicles, and are pure white with wedge-shaped 4-toothed petals.

Culture &c. as above for *S. acaulis*.

S. quadrifida.—A pretty loose-growing European species somewhat resembling *Gypsophila elegans* in appearance. It grows 3–6 in. high, its slender stems being furnished with linear leaves about 1½ in. long. The white wedge-shaped flowers with 4 blunt teeth appear from June onwards in great profusion and are very attractive.

Culture &c. as above for *S. acaulis*.

S. regia (*Royal Catchfly*). — A downy perennial 3–4 ft. high, native of the S. United States. Leaves thickish, ovate lance-shaped, acute. Flowers in summer, deep scarlet, numerous, in clusters; petals spoon-shaped, lanceolate, mostly undivided.

Culture &c. as above for *S. acaulis*. Increased by seeds or division. Should be grown in a warm corner of the flower border.

S. Saxifraga. — A smooth, rather clammy tufted perennial, 3–6 in. high, native of the Alps, with acute linear leaves. Flowers from June to August, yellowish-white above, reddish beneath, and usually borne singly on very long stalks, but occasionally two or three on the same stem.

Culture and Propagation. — Owing to the thickness of its light green leaves this species is excellent for making a carpet under taller plants in the rockery or border, especially as it likes a certain amount of shade, but plenty of ventilation, and a light and rather sandy soil with a little leaf mould or peat.

Seeds may be sown as soon as ripe in the open border, and the young plants may be moved to their flowering positions before the end of September, or in mild weather the following spring. In cold northern parts, it is safer to sow in autumn in cold frames and plant out in spring. Seeds however may also be sown out of doors in April and May for later blooming. The plants may also be divided when they have made good tufts in spring or early autumn, the distance between the replanted portions being 9 to 12 inches.

S. Schafta.—A pretty Caucasian perennial rarely exceeding 6 in. high. Leaves obovate, acute. Flowers from June to October, purple, erect, gradually covering the stems; calyx club-shaped, more than 1 in. long; petals wedge-shaped, small toothed.

Culture &c. as above for *S. Saxifraga*. Like the latter species *S. Schafta* is admirably suited for carpeting patches in the rock garden or border.

S. supina.—A tufted Caucasian perennial, with downy, clammy, woody stems. Leaves linear, acute. Flowers from June to August, white, on short alternate stalks; calyx long, cylindrically club-shaped, woolly; petals long-clawed, cleft.

Culture &c. as above for *S. acaulis*.

S. vespertina. — A beautiful downy annual 1 ft. high, native of Greece. Leaves spoon-shaped, acute, on ciliated stalks. Flowers in summer, rosy, all turned on one side of the raceme; calyx bladdery, club-shaped; petals 2-lobed.

Culture &c. as above for *S. compacta*, or *S. pendula*. Increased by seeds.

S. virginica (*Fire Pink*). — A downy perennial 1–2 ft. high, native of North America. Leaves thin, spoon-shaped, or the upper ones oblong, lance-shaped. Flowers in summer, 2 in. across, deep crimson, few and loosely cymose: calyx oblong cylindrical, becoming obconical; petals oblong, 2-cleft.

Culture and Propagation. — This species is best raised from seeds, as it takes a long time to recover if divided. It should have a particularly well-drained position in the rockery or border, as wetness at the root in winter is more or less injurious to it.

S. Zawadski.—A pretty Galician perennial with rosettes of radical lance-shaped acute leaves, and slender erect flower stems 6–8 in. high, bearing forked clusters of white flowers from May to July. The roundish petals are furnished with 2 linear scales at the base.

Culture and Propagation. — This species requires the same treatment in every way as *S. Saxifraga* and *S. Schafta*, above.

LYCHNIS (Rose Campion).—A genus containing about 30 species of beautiful annual or perennial herbs, often erect, with the habit of *Silene*, from which it differs chiefly in the flowers having more numerous styles—5 instead of 3. Calyx inflated, ovoid, or club-shaped, tubular, 5-toothed, 10-nerved. Petals 5, narrow-clawed, with entire 2-cleft or laciniated blades, often with 2 scales at the base. Stamens 10. Styles 5, rarely fewer

Culture and Propagation.—The Campions are easily grown and thrive in a light, rich, loamy soil. They may be increased by dividing the rootstocks in autumn or spring, or by seeds. They are brilliant objects in the border, and are very useful for the great quantity of flowers they afford for cutting.

The species described below are all perennial except where otherwise mentioned.

L. alpina. — A smooth British and European plant, 4-6 in. high, with crowded narrow linear-lance-shaped leaves 1-2 in. long. Flowers in early summer, about ½ in. across, rosy-pink, in compact heads; petals narrow, deeply cleft.

Culture &c. as for *L. chalcedonica.* Best increased from seeds and with more difficulty by division. This dwarf plant is excellent for carpeting patches in the rockery. It likes partially shaded spots and light sandy soil.

L. chalcedonica. — A handsome and striking species 1½-3½ ft. high, native of Russia. Leaves lance-shaped, somewhat heart-shaped at the base, hairy, stem-clasping. Flowers in summer, bright scarlet, in dense heads; calyx round, club-shaped, ribbed. There is a white-flowered form called *alba*, and also a double-flowered one called *flore pleno*.

Culture and Propagation. — There are many varieties of this fine species, including double red and double white forms. The single-flowered varieties are on the whole best increased from seeds, although they may be also multiplied by division. The seeds may be sown as soon as ripe out of doors in the milder parts of the kingdom, or in cold frames in unfavourable localities. The same remarks apply to spring sowing, but if the plants are required to bloom the same year, it is better to sow the seeds in gentle heat, and have the seedlings grown on and hardened off, so as to be fit for planting in the open border by the end of May or beginning of June.

The double-flowered forms—both scarlet and white—can only be increased by dividing the plants, as they very rarely produce any seeds at all. Division is best done in early autumn, before the end of September, or in mild weather in spring.

The double-flowered kinds are somewhat less vigorous than the single-flowered ones, and are best left undivided if doing well, for at least two or three years, or even more according to circumstances. Splendid tufted plants are produced on well-manured and well-drained loamy soil.

L. Cœli-rosa (*Agrostemma Cœli-rosa*). *Rose of Heaven.* — An annual species about 1 ft. high, native of the Levant. It has tufts of much-branched stems clothed with bright green linear lance-shaped leaves. Flowers during summer, delicate rose, bright purple in the type, with obcordate petals having white scales at the base.

The variety *fimbriata* (also known as *nana*) grows about 9 in. high, and has fimbriated petals. There is also a form of *fimbriata* called *lilacea* having pale lilac blossoms, the plant itself densely tufted and very free-flowering. The white-flowered form resembles the type in every way, with the exception of colour. The variety *purpurea* is compact in habit, with deep purple flowers.

Culture and Propagation.—Being an annual, the Rose of Heaven and its varieties are raised from seed sown annually, either in early autumn in cold frames, or in the open border about April and May, according as early or late flowering is required. The seedlings may be thinned out about 6-8 in. apart when the seeds are sown out of doors in the flowering patches.

L. coronaria (*Agrostemma coronaria*). A species 2-3 ft. high, native of S. Europe, with broadly lance-shaped, leathery leaves, 3 in. long, covered with a whitish woolly down. Flowers in July and August, about 1½ in. across, crimson-red, calyx somewhat bell-shaped, ribbed, petals notched. The variety *atrosanguinea* has fine dark crimson-red flowers. White-flowered and double red-flowered forms are sometimes seen.

Culture and Propagation.—*L. coronaria* and its varieties are excellent border flowers, and are very valuable for cutting. The plants may be increased much in the same way as recommended for *L. chalcedonica*, either by seeds sown in autumn or spring, in cold frames or in the open border according to locality; or by dividing the plants in early autumn or spring. Better plants are however, as a rule, obtained from seeds.

L. **dioica** (*L. diurna*). — *Bachelor's Buttons; Red Campion.* — A native of damp copses, hedgebanks &c. in the British Islands, and also found in Europe, Siberia &c. Stems softly hairy, rarely quite smooth, clammy above, 1–3 ft. high. Lower leaves 3–6 in. long, obovate, stalked; upper ones narrower. Flowers from spring to autumn, purple-rose, usually diœcious in wild specimens—that is, the male flowers are on one plant, the females on another; calyx very hairy, reddish. The double-flowered variety is very attractive. It flowers incessantly and is a fine border plant.

Culture and Propagation. — The double-flowered variety being seedless it may be increased by simply dividing the rootstocks in autumn or spring. The single form however may be increased either by seeds or division in the same way as recommended for *L. chalcedonica.*

L. **Flos-cuculi** (*Cuckoo Flower; Ragged Robin*). — A somewhat rough-stemmed plant 1–2 ft. high, native of moist meadows, copses, cornfields &c., in the British Islands. Lower leaves stalked, oblong lance-shaped, pointed, the upper ones narrow. Flowers in May and June, drooping, rosy, rarely white, petals with 4 linear segments; calyx purplish-red, with ten darker ribs. The double-flowered variety (*flore pleno*) is superior to the type and is more highly valued as a garden plant.

Culture and Propagation. — The Ragged Robin flourishes in any good and well-drained garden soil, and prefers rather damp and shaded situations. It is useful for planting under tall trees or near the edges of pieces of water, or in damp shaded parts of the rockery. For cutting purposes the flowers of both the double and single kinds are very useful.

Seeds of the single variety may be sown either as soon as ripe, or in spring as recommended for *L. chalcedonica*, but the plants may also be increased by dividing the roots about the end of September or in spring. The double-flowered variety can only be increased by division in this way.

L. **Flos-Jovis** (*Agrostemma Flos-Jovis*).—*Flower of Love.*—A Swiss plant 12–18 in. high, with woolly lance-shaped, stem-clasping leaves. Flowers in summer, purple or scarlet, in umbel-like heads. Calyx cylindrical, club-shaped; petals 2-lobed.

Culture and Propagation.—Although a true perennial this species is as a rule better raised from seeds in the same way as *L. coronaria.* The plants, however, may be also divided in spring or autumn. They like a sandy well-drained loam.

L. **fulgens.**—A Siberian perennial 6–12 in. high, with ovate lance-shaped, hairy leaves. Flowers in spring and summer, bright vermilion, large and handsome; petals 4-cleft; outer divisions awl-shaped; calyx cylindrical, woolly.

Culture and Propagation.—This brilliant species requires to be grown in rich and well-drained turfy loamy soil, or well-manured garden mould, as it sometimes fails to establish itself if neglected. Seeds are freely produced, and may be sown as soon as ripe in cold frames, afterwards pricking the seedlings out and growing them on in the frames until mild weather in spring, when they may be planted out in the open border. Here they should be grouped in bold masses for effect, each plant being 6–9 in. away from the next. The plants may be increased by division about September, or in spring, and also by means of cuttings of the young shoots. The latter are best taken in spring, and inserted in light sandy soil, and placed on a gentle hotbed until rooted. They are afterwards potted up singly, and when established are hardened off for planting out.

L. **grandiflora.**—A Chinese species 8–12 in. high. Leaves ovate, almost stalkless, smooth. Flowers from June to August, brick-red or scarlet, about 2 in. across, with spreading lacerated petals, and an inflated calyx.

Culture and Propagation.—This beautiful perennial is not quite hardy in all parts of the kingdom, and hence may require some little protection with bracken or dried leaves &c. in the colder and more northern parts in severe winters. It likes a well-drained sandy loam and peat or leaf soil, and a warm, sheltered and partially shaded situation in the rock garden or flower border. If seeds are produced they may be sown as recommended for *L. fulgens* above. Failing them, the plants may be divided about the middle or end of September, and replanted about 9 or 12 in. apart in masses. Division may also take place in spring, but does not as a rule succeed so well as when done in early autumn. Cuttings of the young shoots may also be rooted like those of *L. fulgens*.

L. haageana. — This fine plant is supposed to be a hybrid between *L. fulgens* and *L. coronaria* or *L. grandiflora*. It has shaggy stems, 1–2 ft. high, and large lance-shaped, pointed, hairy leaves purple-brown beneath. Flowers in summer, 2 in. or more across, bright scarlet. Petals broadly obovate, somewhat deeply notched, and with 2 awl-shaped teeth at the side. Calyx shaggy, swollen, and angled.

There are several varieties varying in colour from scarlet to pure white, the intermediate shades being rose, salmon, pink &c. The form known as *grandiflora* has very fine and brilliant flowers of various shades, and that known as *nana* represents a somewhat dwarfer and more compact race.

Culture and Propagation.—This is undoubtedly one of the finest, most showy border perennials. It flourishes in ordinary good and well-drained garden soils. It however prefers a mixture of peat and loam, and may be massed in front of Rhododendrons, Azaleas, and other Ericaceous plants. *L. haageana* and its varieties may be increased by sowing seeds as soon as ripe, or in spring, in the way recommended for *L. chalcedonica* or *L. fulgens*, and plants obtained in this way present a great variety of shades of colour. Any choice or rare variety however may be increased by division in early autumn or spring, and also by means of cuttings of the young shoots, in the same way as recommended for *L. fulgens* and *L. grandiflora*.

L. Lagascæ (*Petrocoptis pyrenaica*). A beautiful Pyrenean species about 3 in. high. Leaves obovate or oblong, rather leathery, and slightly glaucous. Flowers in spring and summer, bright rose, less than 1 in. across, with a white centre. This is a fine tufted plant for sunny parts of the rock garden.

Culture &c. as for *L. alpina* above.

L. oculata (*Viscaria oculata*). — A lovely Algerian annual, 6–18 in. high, forming compact and free-flowering tufts. Leaves glaucous lance-shaped acute, becoming narrower up the stems. Flowers in summer in great profusion, pinkish-purple, the notched petals having a deep purple spot at the base. Calyx suddenly contracted below the middle.

There are several desirable varieties such as *cardinalis*, bright crimson-purple; *cærulea*, bluish; *alba*, white; *Dunnetii*, rose; *splendens*, scarlet; *elegans picta*, crimson-purple edged with white; and *nana*, a dwarf about 9 in. high with flowers of various shades, rose, purple, and white.

Culture &c. as above for *L. Cœli-rosa*.

L. Presli.—A native of Poland, 12–18 in. high. Lower leaves numerous, in rosettes, ovate-lance-shaped, or obovate pointed, prolonged down the stem; upper leaves ovate, abruptly pointed, entire, much veined, deep green. Flowers in summer, purplish or carmine-rose, about 1 in. across, opening in the daytime, numerously produced in forked panicled clusters, and having reddish bracts; the corona in the centre is fringed, satiny and rose-white; calyx reddish, much swollen.

Culture &c. as above for *L. Haageana.*

L. pyrenaica. — A Pyrenean species, 3–4 in. high. Leaves glaucous, leathery, lower ones spoon-shaped, those of the stem heart-shaped, sessile. Flowers in summer, pale flesh colour, about ½ in. across, in forked clusters. Petals slightly notched; calyx bell-shaped.

Culture &c. as above for *L. alpina.*

L. Sieboldi.—A handsome Japanese species about 1 ft. high. Leaves sessile, lower ones oblong, closely set, the others ovate-oblong acute, entire, soft and downy. Flowers in summer, large pure white, with wedge-shaped irregular slightly notched petals with jagged edges.

Culture &c. as above for *L. grandiflora.*

L. vespertina (*L. alba*).—*White Campion.*—A British and European species 1–3 ft. high, with swollen-jointed purplish stems. Leaves connate, ovate-oblong, pointed, tapering at the base, hairy, the lower ones stalked, the upper ones sessile. Flowers from May to August, white, slightly scented in the evening. Calyx over ½ in. long, hairy, ribbed; petals cleft. The double-flowered variety *flore-pleno* is best known, and is more highly valued for the flower garden. It is an excellent border plant and has large white flowers that are very useful for cutting.

Culture &c. as above for *L. dioica.* The double-flowered variety must be carefully divided when it is wished to increase the stock.

L. Viscaria (*German Catchfly*). — A handsome evergreen 10–18 in. high, native of Britain, Europe &c., with smooth erect stems, clammy at the nodes. Lower leaves 3–5 in. long, grass-like, with stalks downy at the margins. Flowers in early summer, almost sessile, with obovate red-purple notched petals. Calyx ½ in. long, purple, swollen upwards.

There are several varieties, among which *alba*, white, *splendens*, deep red, and the double-flowered form (*flore-pleno*) with rosy-pink blossoms are best known.

Culture and Propagation. — This species and its varieties, especially the beautiful double-flowered ones, are excellent border or rock plants, and when grown in masses produce a very striking effect when in blossom. The single-flowered varieties produce seeds in abundance, and may be increased by that means in the same way as *L. haageana* or *L. chalcedonica.* They are also very readily multiplied by dividing the tufts in early autumn or in spring, and this is the only way that the double-flowered forms can be increased, besides cuttings of the young shoots in spring in the same way as mentioned under *L. fulgens.*

CERASTIUM (MOUSE-EAR CHICKWEED).—A genus containing according to some authors about 100 species, but reduced to about 10 by Bentham and Hooker. Chiefly downy or hairy, rarely smooth, annual or perennial herbs. Leaves various, but rarely awl-shaped. Flowers in terminal, forked, sometimes leafy, sometimes almost naked, cymes. Sepals 5, rarely 4. Petals equal in number, notched or 2-cleft, very rarely entire or laciniated, sometimes minute. Stamens 10, or fewer by abortion. Styles 5, rarely 4 or 3, opposite the sepals. Capsule cylindrical or cylindric-conical, often incurved.

Culture and Propagation.—All the Cerastiums grow readily in ordinary garden soil. They are easily increased by division in early autumn or in spring; or by cuttings in the open border in a shady place during the summer and autumn months. Seeds are freely produced by many kinds, and may be sown as soon as ripe in pots or pans of well-drained soil, and placed in cold frames during the winter months. The seedlings should be pricked out when large enough to handle into other boxes or pans, and should have as much light and air during the winter as possible and on all favourable occasions. They will be strong and sturdy for planting out in spring. Of the perennial species described below, *Biebersteini*, *grandiflorum*, and *tomentosum* are most generally grown on account of their attractive silvery foliage. They are effective for borders and edgings, and contrast forcibly with the brighter colours of other plants. They are also useful for massing in the rockery, and most of the species like an open and sunny situation.

C. alpinum.—A British species 2–4 in. high. Leaves ovate elliptic or oblong. covered with long silky hairs, or smooth, Flowers in summer, white; panicles rather hairy, few-flowered. There are several forms, the best known perhaps being *lanatum* and *villosum.*

Culture &c. as above. This species seeds freely.

C. Biebersteini.—An evergreen species about 6 in. high, native of Tauria. Stems branching, with woolly ovate-lance-shaped leaves. Flowers in early summer, white, on erect forked stalks.

Culture &c. as above.

C. Boissieri.—A Spanish species 4–12 in. high, with sessile silvery leaves, usually ovate-lance-shaped, acute, entire. Flowers in early summer, white, large, in regular forked cymes.

Culture &c. as above.

C. decalvans.—An interesting plant, native of Servia. It has trailing and rather woody stems, and dense rosettes of green leaves covered with tufts of wool. The numerous pure white flowers appear in May and June.

Culture &c. as above.

C. grandiflorum.—A strong-growing deciduous species about 6 in. high, native of E. Europe. Leaves narrow, acute, hoary or woolly, with somewhat revolute margins. Flowers in summer, white, large, conspicuous, 7–15 on an erect stalk.

Culture &c. as above.

C. latifolium.—A deciduous European species 3–6 in. high, with ovate slightly stalked leaves, pale green or slightly glaucous. Flowers in summer, large, white, solitary, or on sparingly forked stalks.

Culture &c. as above.

C. purpurascens. — A remarkable species, native of the alpine regions of the Caucasus. It has a bulbous rootstock from which spring stems 2½–3½ in. long, furnished with oblong linear-lance-shaped leaves. The rather large flowers appear in summer and are of a beautiful blue, which contrasts well with the purple sepals.

Culture and Propagation.—This is a very effective plant in the rock garden when in blossom. It will grow in well-drained soil in sunny situations, but can be increased only by means of seeds sown in the way advised above. As neither runners nor side shoots are produced from the central stock it cannot be increased by division.

C. tomentosum.—A beautiful and well-known evergreen species, 6 in. high, native of S. and E. Europe. Leaves silvery and oblong, spoon-shaped, upper ones lance-shaped. Flowers in early summer, white, in forked cymes on erect stalks. This species is extensively used as an edging for beds, borders, banks &c.

Culture &c. as above.

ARENARIA (Sandwort).—A genus of more than 130 species of annual or perennial herbs, sometimes slender or stiffish with small awl-shaped leaves, sometimes spreading or tufted with broader leaves. Flowers terminal, cymose-paniculate, or capitate, rarely axillary or almost solitary. Sepals 5, rarely 4. Petals equal in number, white, or very rarely red, entire or slightly notched, or rarely absent. Stamens 10, rarely 8 or fewer by abortion. Styles 3, seldom 2, or 4–5 in some flowers.

The plants known as *Alsine* are now referred to this genus.

Culture and Propagation. — The Arenarias are pretty little plants, chiefly suitable for the rock garden in more or less exposed situations, in ordinary soil. The perennial species, which only are worth growing, may be increased by division in early spring or autumn; by seeds sown in spring in a cold frame; or by cuttings put under a bell glass during the spring and summer months, keeping them shaded until fairly well rooted. The following are some of the best Sandworts.

A. balearica. — A pretty perennial Sandwort, native of Corsica, with very small ovate, shining, rather fleshy, ciliated leaves. Flowers in early summer, white, numerous, borne on purple or violet stalks 1–3 in. high.

Culture and Propagation.—This is an excellent plant for covering the faces of rocks or stones, as the tiny foliage almost adheres to the surface, making it a mass of deep shining green with scarcely an interstice. It likes open, airy, and partially shaded situations with plenty of moisture. If exposed to hot sunshine and drought it soon becomes parched and withered.

Seeds are freely produced, and though minute may be saved with comparative ease if picked before the pods are ripe enough to burst. The seeds may be sown as soon as ripe in pots or pans of fine sandy soil, and require scarcely any covering. They must be kept shaded and moist, and when the tiny seedlings are well above ground, they may be pricked out into similar pots and pans, and wintered in cold frames until spring.

An easier method of increase however is by dividing the plants at any time during the summer months. The divided portions should be placed on fine soil, and have a little soil sprinkled here and there over the patches to hold the plants down. If kept shaded and moist they will soon root, and may be placed in the rockery.

A. ciliata. — A procumbent, tufted evergreen species, 2–3 in. high, native of Ireland, the Orkney and Shetland Isles, Europe &c. Leaves small, ovate, downy, fringed with hairs near the base. Flowers in summer, about ½ in. across, white, with spoon-shaped petals.

Culture &c. as above.

A. graminifolia.—A tufted evergreen grassy Caucasian plant 6–10 in. high. Leaves long, awl-shaped, rough-edged. Flowers in summer, white, on erect stalks; petals obovate, 5–6 times longer than the blunt sepals.

Culture &c. as above.

A. grandiflora.—A native of France. 3–6 inches high. Leaves awl-shaped, 3-nerved, fringed with hairs, lower ones crowded. Flowers in summer, white, usually solitary, on long downy stalks. The variety *biflora* has two flowers on a stem, and *triflora* three.

Culture &c. as above.

A. laricifolia.—A Swiss species about 6 in. high, with awl-shaped leaves toothletted and ciliated on the edges. Flowers in summer, white, 1, 3, or 6, borne on rather rough upright stems.

Culture and Propagation.—This species is suitable for rockeries or border edgings, and flourishes in light sandy soil in sunny situations. It is easily increased by division of the tufts in early autumn or spring, or may be raised from seeds in the same way as *A. balearica.*

A. longifolia.—A Siberian species 6–9 in. high, with awl-shaped, thread-like, serrulated leaves. Flowers in summer, white, crowded on three-forked smooth panicles.

Culture &c. as above.

A. montana. — A handsome species about 8 in. high, native of France and Spain. Leaves lance-shaped linear, borne on very long stems, procumbent. Flowers in summer, white, large, over an inch across, solitary, on long stalks.

Culture &c. as above. As an ornamental plant for hanging over the faces of rock in half-shaded places in the rockery, *A. montana* is superior to any other species of Arenaria. Its loose and elegant and numerous white flowers make it a charming picture in suitable positions. It is easily increased by cuttings made in April and May, and inserted in sandy soil in shaded spots. Seeds are also freely produced and may be sown when ripe or in spring.

A. peploides (*Honkenya peploides*).—*Sea Purslane.*—A native of British seashores, 3–4 in. high, with rather fleshy, ovate-acute, recurved leaves. Flowers from May to August, ¼ in. across, white. Petals of the staminate flowers as long as sepals; of the pistillate flowers shorter.

Culture &c. as above.

A. purpurascens. — A closely tufted evergreen species, about 6 in. high, found abundantly on the higher Pyrenees. Leaves smooth, ovate lance-shaped, pointed, stalkless. Flowers in early summer, purplish, numerous, borne on downy stalks.

Culture &c. as above.

A. rotundifolia. — A Siberian species 4–6 in. high. Leaves about ¼ in. across, roundish, ciliated, on tufted branches. Flowers in summer, white, solitary, with roundish ovate petals.

Culture &c. as above.

A. tetraquetra. — A distinct looking tufted species about 6 inches high, native of the French Mediterranean shores. Leaves ovate, edged with a white cartilage, and fringed at the base. Flowers in summer, white, in heads, with narrow leaves between.

Culture &c. as above.

A. verna. — A native of dry rocks, pastures, banks &c. in the British Islands, and also found in Central Europe, N. Africa, and N. America. It is 1–3 in. high, with densely tufted 3-nerved awl-shaped leaves. Flowers in early summer, ⅓ in. across, white, with greenish centres, freely produced. The variety *cæspitosa* has very leafy stems, smooth calyx and flower stalks. In the variety *Gerardi* the leaves do not end in a small point.

Culture &c. as above.

SAGINA (PEARLWEED; PEARLWORT).—A genus of about 8 small tufted annual or perennial herbs, with awl-shaped leaves, and small, usually long-stalked flowers. Sepals 4–5. Petals 4–5, entire, or slightly notched, sometimes minute or absent. Stamens equal in number to the sepals, or twice as many, or fewer by abortion. Styles equal in number to the sepals and alternate with them.

Culture and Propagation.—The Pearlworts being mostly weeds, the species mentioned below is the only one worthy of notice as a garden plant. It may be raised from seed sown in May, and increased in the autumn by dividing the patches. For making a green carpet or edging to a border it is very useful, and great hopes were at one time entertained of its value for making lawns, but with the greatest care it becomes too patchy for this purpose.

S. pilifera (*Spergula pilifera*). — A tufted moss-like plant, about 2 in. high, native of Corsica. Leaves linear, awl-shaped, smooth. Flowers in summer, small, white; petals twice as large as the oblong blunt sepals. The variety *aurea* has golden-yellow foliage, and is more or less used for carpet bedding.

Culture &c. as above.

XX. PORTULACEÆ—Purslane Order

An order containing about 15 genera and 125 species of succulent herbs or undershrubs, often smooth, but sometimes hairy. Leaves alternate, seldom opposite, entire, often fleshy. Stipules scarious, sometimes lacerated, or changed into hairs, or absent. Flowers solitary, at the ends of the branches, racemose, cymose, or paniculate, the lower ones axillary or lateral. Sepals usually 2, rarely 5, free, or adnate to the base of the ovary, much imbricated, persistent or deciduous. Petals 4–5, rarely numerous, hypogynous or rarely perigynous, free, or connate at the very base, imbricate, entire, often fleeting or deliquescent. Stamens inserted with the petals, often adnate to them at the base, sometimes equalling them in number, sometimes fewer and opposite, sometimes numerous; filaments thread-like, distinct. Carpels 3 or more; stigmas several, much divided.

PORTULACA (PURSLANE).—A genus containing about 16 species of spreading or ascending fleshy herbs, with alternate or nearly opposite flat or rounded leaves, often with tufts of bristles in the axils, the upper ones often forming an involucre round the flowers. Sepals 2, cohering in a tube and adnate to the base of the ovary, free above, deciduous. Petals 4–6, free, or slightly connate at the base. Stamens 8 or more, at the base of the petals, and with them perigynous. Style deeply cut into 3–8 branches.

Culture and Propagation.—Outdoor Portulacas are best treated as annuals. The seeds may be sown thinly in April in pans in a cold frame. By June the seedlings will be ready for planting out. If pricked off into pots or pans previously and kept in a well-aired frame the seedlings make much better plants. Seeds may also be sown in the open border about the end of May, to bloom later than those raised under glass.

The double-flowered varieties may be increased by means of cuttings during the summer and autumn months, but this process necessitates keeping the plants under glass during the winter period. The cuttings should be inserted in light sandy soil and may be rooted in a shaded part of the garden, out of doors or under a handlight; or if the season is unfavourable on a gentle hotbed.

Portulacas are not particular as to soil, but rich loam and leaf mould suit them best. They should be planted in the sunniest and warmest parts, and in bold masses to secure better effect when in bloom. The best kind to grow is:

P. grandiflora (*Sun Plant*).—A beautiful Brazilian plant, about 6 in. high, with cylindrical, acute leaves, having tufts of hairs in the axils. Flowers in summer, crimson-purple, three or four together, crowded, surrounded by whorls of leaves and crowded hairs. The variety *Thellusoni* is a taller plant, with less cylindrical and blunter leaves than the type, and large scarlet flowers, with 2-lobed petals. There are several forms such as *aurea*, *aureo-striata*, *alba*, *coccinea*, *splendens*, *caryophylloides*, *Thornburni*, *aurantiaca*, *Bedmanni* &c., with single flowers of various hues, and most of them are obtainable from a packet of mixed seed. The variety called *plena* has beautiful double flowers of a brilliant crimson-purple, and looks very handsome.

The popular name of 'Sun Plant' is derived from the fact that the flowers open as a rule only during bright sunshine; hence the necessity for planting in warm sunny positions to obtain the best results.

Portulaca oleracea, an Indian annual, is sometimes grown as a salad, the leaves being eaten fresh or in a cooked state.

CALANDRINIA (ROCK PURSLANE). A genus containing about 60 species of smooth or hairy annual or perennial herbs, sometimes shrubby at the base. Leaves alternate or tufted, rather fleshy. Flowers solitary, long-stalked, or axillary, or in loose terminal racemes or contracted heads. Sepals 2, herbaceous, ovate, persistent, or rarely deciduous. Petals 5, often ephemeral, rarely fewer or numerous, hypogynous. Stamens 5 or more, free, cohering into a ring at the base, or adhering to the petals. Capsule globose or ovoid, 3-valved.

Culture and Propagation. — The species described below are the ones chiefly grown as annuals from seed, except *C. umbellata*, which is treated as a biennial. They like a light sandy soil in warm places in the rock garden. As the plants do not transplant well, it is better to sow seeds where the plants are to flower, protecting them with handlights or sheets of glass until all danger of frost is over. The flowers of most species expand only in bright sunshine, thus resembling the Portulacas.

C. discolor. — A Chilian plant 12–18 in. high, with fleshy obovate leaves, narrowed at the base, pale green above, purple beneath. Flowers in summer, bright rose, 1½ in. across, with a yellow tuft of stamens in the centre, borne on long racemes. The blossoms are at first drooping, but become erect when fully expanded. This species is often called *C. elegans* in gardens.

Culture &c. as above. Seeds may be sown in the open border in warm sheltered situations, with plenty of sunshine, in April and May, and even as late as the end of June, to secure a succession of flowering till late in autumn. The seedlings when large enough may be thinned out 6–8 in. apart.

C. grandiflora.—A native of Chili 1 ft. high, with rather shrubby stems. Leaves fleshy, rhomboid, acute, stalked. Flowers in summer, 2 in. across, rosy, in loose racemes; calyx spotted with black.

Culture &c. as above.

C. Menziesi (*C. speciosa*).—A Californian species with much-branched stems at first prostrate, but afterwards turning upwards 12–18 in. high. Leaves spathulate, much narrowed towards the base. Flowers from June to September, deep purple-crimson, ½–1 in. across.

Culture &c.—This is one of the most beautiful members of the genus and looks very effective grown in large patches. Seeds may be sown at intervals from April to July to keep up a succession of blossom.

C. nitida. — A pretty tufted species about 6 in. high, native of Chili. Leaves smooth, oblong, spathulate, sub-acute, narrowed at the base. Flowers in summer, rosy, about 2 in. across, and borne in many-flowered leafy racemes.

Culture &c. as above for *C. discolor.*

C. oppositifolia.—A pretty Californian species with a thick and fleshy tuberous rootstock, and oblanceolate leaves 2–2½ in. long. The pure white or blush flowers, each about 1½ in. across, are borne in late summer, 3 or 4 on a stem 3–6 in. high. The sepals are roundish and sharply toothed, as are also the 5 deeply cleft petals, surrounding a cluster of about 20 stamens in the centre.

Culture &c. as for *C. umbellata* below. This species is rather tender and is best wintered in a cold greenhouse in unfavourable parts of the kingdom. *C. Tweedyi*, a dwarf-tufted species with thick fleshy leaves and bronzy flesh-coloured flowers, would probably succeed if treated in the same way, at least in the milder parts of the kingdom.

C. umbellata.—A distinct and pretty Peruvian species about 6 inches high, with radical, linear, acute, hairy leaves. Flowers in summer and autumn, brilliant magenta-crimson, less than 1 in. across, in many-flowered cymose corymbs.

Culture and Propagation. — This species is a perennial on dry soils, and may be grown in warm fully exposed sunny parts of the rock garden. The seeds should be sown in fine sandy soil in pots or in the open some time during September, or in April and May as mentioned above for *C. discolor.* If sown in pots the seedlings should not be pricked out, as they are apt to perish by such treatment, but the whole potful—soil and all—should be carefully planted without breaking the soil. In favourable parts of the kingdom this species and also *C. grandiflora* will often reproduce themselves from self-sown seeds.

CLAYTONIA.—A genus containing about 20 species of fleshy annual or perennial herbaceous plants, usually smooth, sometimes with tuberous rootstocks. Lower leaves stalked, upper ones alternate or opposite. Stipules none. Flowers in terminal racemes or cymes, rarely axillary or solitary. Sepals 2, herbaceous, ovate, persistent. Petals 5, hypogynous. Stamens 5, opposite the petals, and adhering to them at the base. Style 3-cleft or 3-furrowed.

Culture and Propagation. — Claytonias are adapted for the rockery or wild garden. The annual fibrous-rooted species may be increased by seeds; the tuberous-rooted ones also by seeds, or by offsets taken in autumn or spring. The tuberous species thrive best in damp peaty soil; the annuals in loamy soil.

C. caroliniana. — A spreading dwarf species, native of North America, with spathulate oblong or ovate-lance-shaped leaves. Flowers in spring, rosy, in loose racemes.

Culture &c. This species may be grown in peaty soil in the rock garden in partially shaded and moist situations. It may be increased by seeds sown as soon as ripe in pots or pans in cold frames. The seedlings are pricked out and grown on till the following spring before transferring to the open ground. The roots may also be divided in early autumn or in spring.

C. perfoliata. — An annual species 3–6 in. high, native of N.W. America to Mexico, and Cuba, also found naturalised in parts of the British Islands. Upper leaves connate or perfoliate, forming a roundish disc; lower ones stalked, oval-rhomboid. Flowers from May to August, white, small.

Culture &c. This species will grow in any garden soil, and may be increased by seeds sown out of doors as soon as ripe, or in April and May.

C. sibirica. — A Siberian perennial 3–6 in. high, with spindle-shaped roots. Leaves ovate, the lower ones stalked, upper ones opposite, sessile. Flowers in spring, rosy, with 2-cleft petals.

Culture &c. as above for *C. caroliniana.*

C. virginica.—A tuberous-rooted N. American perennial 3 in. high. Leaves linear lance-shaped. Flowers in spring, white, with notched petals.

Culture &c. as above for *C. caroliniana.*

SPRAGUEA.—A genus containing only one species here described :—

S. umbellata. — A rare Californian perennial 6–9 in. high, with somewhat fleshy spathulate leaves, and small scarious stipules. Flowers in summer, pinky-rose, in dense imbricated spikes. Sepals 2, roundish heart-shaped, membranaceous, persistent. Petals 4, hypogynous. Stamens 3, opposite the petals, and adhering to them at the base. Style 2-cleft.

Culture and Propagation. — This species is probably not quite hardy in unfavourable parts of the country, and in such places may require slight protection. It grows in ordinary soil and is useful for the rockery, or edges of the flower border. To obtain flowers the same year, seeds should be sown on a hotbed in February, the seedlings being pricked out singly into small pots so as to be ready for planting out by the end of May, to bloom in August and September. Seeds sown later in the open will not produce flowers until the following spring or summer.

LEWISIA.—Like the preceding, this genus has only one species :—

L. rediviva (*Spatlum*).—A remarkable and pretty N. American plant 1–3 in. high, with edible, tapering, fleshy, red-stemmed roots, white within. Leaves densely tufted, linear, fleshy, withering on the appearance of the flowers. The latter appear in summer on one-flowered scapes, jointed above the middle, pink, with a nearly white centre, 3–4 in. across. Sepals 6–8 (most of the other plants in this order have only 2), broadly ovate, contorted, imbricate, finely veined with red, persistent. Petals 8–10, hypogynous, imbricate. Stamens numerous, inserted with the petals. Styles deeply 6–8-cleft.

Culture and Propagation. — This species should be planted in a nook or crevice in the rockery, where its fleshy roots will obtain plenty of moisture. The position, however, should be a sunny one, as the flowers will not readily develop in shady spots. After blooming the plant shrivels up into a withered string-like mass. In very hot seasons the plants should be watered every day. *Lewisias* are increased by seeds, or by dividing the roots in spring. The seeds should be sown as soon as ripe in pots or pans in cold frames, and the seedlings after being pricked out should be grown on during the winter months in the frames until fine weather in spring, when they may be planted out. Or the seeds may be sown in gentle bottom heat about February and March. The seedlings are pricked out and hardened off so as to be ready for the open air by the end of May or beginning of June.

XXI. TAMARISCINEÆ—Tamarisk Order

A small genus containing 5 genera, and about 40 species of shrubs or undershrubs, rarely trees or durable herbs. Leaves alternate, very small, often scale-like, imbricate, entire, and often fleshy with a usually pitted surface. Stipules none. Flowers regular, often hermaphrodite, in close spikes, or racemes, often white or rose, flesh-coloured, small or showy. Sepals 5, rarely 4, free or connate at the base, much imbricated in bud. Petals 5, rarely 4, free, or cohering in a tube at the base. Disc hypogynous or slightly perigynous, 10-glandular, crenate or angulate, rarely absent. Stamens 5 or more, inserted on the disc, free, or variously connate at the base. Anthers 2-celled, versatile. Ovary free, 1-celled, or imperfectly septate. Capsule dehiscent, leathery.

TAMARIX (TAMARISK). — A genus containing about 20 species (50 according to some authors) of small trees or bushes, with minute, scale-like leaves, stem-clasping or sheathing. Flowers white or rose, in spikes or dense racemes. Sepals 4–5, rarely 6, free. Petals 4–5, inserted under the glandular, crenate, angled or lobed disc, free, or slightly connate at the base. Stamens 5-10, rarely 4, or 11-12, inserted on the disc, free or connate in a ring near the base. Ovary narrowed upwards; styles 3–4, short, thick.

Culture and Propagation. — The Tamarisks thrive in almost any good garden soil, and are very effective ornaments in shrubberies and borders. Along the south coast and in the Channel Islands the common Tamarisk (*T. gallica*) is a lovely feathery, Heath-like tree. Plants may be increased by inserting cuttings of the flowerless shoots about 4 in. long under glass in sandy soil during the summer months. When well rooted they may be planted out in spring in a warm sunny border and well watered.

Seeds may also be sown as soon as ripe in cold frames, and the young plants may be grown in the frames until the following spring, when they may be transferred to a warm and sheltered border. Seeds may also be sown in spring and treated in the same way.

T. chinensis. — This is somewhat similar to *T. gallica*, but has if anything a more graceful and feathery appearance. It is sometimes called *T. japonica plumosa*, and produces pink flowers.

Culture &c. as above. It is not quite so hardy as *T. gallica*.

T. gallica (*Common Tamarisk*). — A fast-growing, beautiful evergreen shrub 6–12 ft. high, native of Britain, and also distributed throughout Europe to India. Leaves very small, closely imbricated, triangular, auricled and keeled on the very slender, feathery branchlets, and about ⅛ in. long, and awl-shaped on older wood. Flowers from July to September, white or pink, in catkin-like spikes 1 in. long.

Culture &c. as above.

T. hispida (*T. khasgarica*).—This is a recently introduced species from Central Asia. The leaves are very small and blue-green in appearance, closely pressed to the stems, and the rosy-carmine flowers are produced in autumn.

Culture &c. as above.

T. parviflora (*T. africana*). — A native of S.E. Europe, 6–10 ft. high, with small lance-shaped acute leaves, slightly keeled. Flowers in summer, pink, crowded on spikes or lateral racemes.

Culture &c. as above.

T. tetrandra. — A Caucasian shrub 6-8 ft. high, with lance-shaped stem-clasping leaves. Flowers in summer, pinkish-white, borne on lateral racemes about 1½ in. long, and remarkable for having only 4 stamens or anthers, as indicated by the name.

Culture &c. as above. This species is very hardy and produces seeds freely in the neighbourhood of London.

MYRICARIA.—A small genus containing 3 or 4 closely related species of deciduous undershrubs, with small, narrow, clustered leaves. Flowers rosy or white, in long spiked terminal racemes, leafy at the base. Sepals and petals 5, free. Stamens usually 10, inserted on the disc, slightly connate at the base or beyond the middle.

M. germanica.—An elegant Heath-like shrub 3–6 ft. high, native of Europe and Asia, with rigid, erect, and slightly angular branches. Leaves somewhat glaucous, linear, blunt, spotted. Flowers in summer, white or rose-tinted, in spike-like racemes; petals lance-shaped, acute.

Culture and Propagation.—The above is the only species of note. It is a good shrub for dry banks in warm sandy soils, and may be increased by seeds sown in the open air about May, or by cuttings of the firm young wood during the summer months, inserted in light sandy soil under a handlight. They may be transplanted in mild weather the following spring.

REAUMURIA.—A genus of 10 species of little-known much-branched procumbent or straggling shrubs with small or roundish, fleshy, often clustered leaves. Flowers terminal, solitary, often showy, larger than in *Tamarix*. Sepals 5, nearly connate at the base or almost free, surrounded by few or many imbricated sepaloid bracts. Claws of the petals broad. Stamens numerous, free, or in 5 bundles opposite the petals, more or less connate at the base. Styles 5, awl-like.

R. hypericoides.—A beautiful Syrian shrub about 2 ft. high, with leathery leaves, varying from linear to lanceolate oblong. Flowers in summer, purple; petals irregular, ovate or ovate-oblong, very blunt, with appendices short and slightly fimbriate at the apex.

Culture and Propagation.—This species grows readily in sandy loam and peat in a warm corner of the border or shrubbery. Cuttings of the ripe young wood root readily in a sandy soil under a bell glass in the same way as recommended for *Tamarix* and *Myricaria.*

XXII. HYPERICINEÆ—St. John's Wort Order

An order containing 8 genera and over 200 species of evergreen or deciduous herbs, shrubs, or rarely trees. Leaves opposite, rarely verticillate, simple, entire, penni-nerved, or glandular-toothed, herbaceous, or very rarely leathery in texture, sometimes small or needle-like, usually full of pellucid dots, and bordered with black glands. Stipules none. Flowers regular, hermaphrodite, terminal or rarely axillary, solitary, cymose or cymose paniculate, usually yellow or white. Sepals 5, rarely 4, imbricate. Petals 5, rarely 4, hypogynous, imbricate, often contorted, bordered with blackish dots, sometimes with a fleshy scale or hollow at the base. Stamens numerous, hypogynous, often in 3 or 5 connate or approaching bundles, sometimes in many bundles, with fleshy glands intervening.

HYPERICUM (St. John's Wort). A genus containing about 160 species of deciduous or evergreen shrubs or undershrubs. Leaves often almost sessile, small or membranaceous, entire or rarely somewhat toothed, usually with pellucid black dots at the edges. Flowers yellow, rarely white, solitary, cymose or paniculate. Sepals and petals 5. Stamens free or slightly cohering at the base into 3–8 bundles. Styles distinct or rarely cohering.

Culture and Propagation.—Hypericums prefer a rich sandy loam, but will grow readily in any ordinary garden soil. They are useful for shrubberies, borders, banks, or in beds by themselves. They are increased quickly from seeds or cuttings, or by dividing the creeping rooted species. The half-hardy kinds may require a little protection in winter in northern parts of the country. All the kinds described below lose their leaves in winter and have yellow flowers except where otherwise stated.

H. ægyptiacum.—A half-hardy round-stemmed evergreen 6–18 in. high, native of N. Africa and the Levant. Leaves glaucous, small, ovate, crowded, without dots. Flowers in summer, small, few, almost sessile.

Culture and Propagation.—Although from sunny Mediterranean climes this species is hardy in ordinary winters in the neighbourhood of London. It must, however, be grown in warm and sheltered spots and in well-drained rather sandy soil. Cuttings of the ripened or half-ripened shoots, without flower buds, may be rooted under a handlight during the summer and autumn months, and transplanted the following spring. Seeds may also be sown as soon as ripe, if obtainable, and the young plants moved into a warm border the following spring after all danger from frost is over.

H. Androsæmum (*Sweet Amber; Common Tutsan*).—A sub-shrubby species, native of Britain, with sessile, ovate, somewhat heart-shaped leaves, minutely dotted. Flowers in summer, large, terminal, stalked.

Culture &c. as above. Seeds freely produced.

H. Ascyron.—A Siberian species 3 ft. high, with 4-angled stems. Leaves stem-clasping, lance-shaped, acute, full of pellucid dots. Flowers in summer, very large.

Culture &c. as above. Seeds freely produced.

H. calycinum (*Aaron's Beard; Rose of Sharon*).—A beautiful almost evergreen species about 1 ft. high, with 4-angled stems, native of S.E. Europe, and naturalised in parts of Britain. Leaves broadly ovate, lance-shaped, leathery, full of pellucid dots. Flowers in summer, large, terminal, solitary, 3 in. across.

Culture &c. as above. Seeds freely.

H. Coris. — A half-hardy round-stemmed evergreen 6–24 in. high, native of the Levant. Leaves in whorls, linear, with revolute edges. Flowers from May to September, less than 1 in. across.

Culture &c. as above, p. 265.

H. elatum. — A N. American species about 5 ft. high, having reddish stems when young. Leaves ovate-oblong acute, dilated at the base, slightly notched and rather revolute at the edges. Flowers in July, borne in corymbose clusters.

Culture &c. as above. Seeds produced freely.

H. elegans. — A fine Siberian plant 1 ft. high, with winged and black-dotted stems. Leaves ovate-lance-shaped, somewhat stem-clasping, bluntish, full of pellucid dots. Flowers in summer, borne in racemose clusters.

Culture &c. as above. This species seems to be somewhat rare.

H. elodes.—A native of bogs, ditches and wet moors in the British Islands, with creeping, round, hairy stems. Leaves roundish, ovate blunt, shaggy, woolly, full of pellucid dots. Flowers in summer, ½ in. across, pale yellow with green ribs, opening only in sunshine. Sepals smooth, oblong blunt, with red glandular serratures.

Culture &c. as above. A good plant for the bog garden.

H. empetrifolium.—A half-hardy evergreen 6–12 in. high, native of South Europe, with slender erect 4-angled branchlets. Leaves linear with revolute margins. Flowers in summer; petals without glands.

Culture &c. as above, p. 265.

H. hircinum (*Goat-scented St. John's Wort*).—A species from the Mediterranean region, 2–4 ft. high, with winged branches. Leaves dilated, sessile, ovate-lance-shaped, with glandular edges. Flowers in summer, large, with very long styles.

There is a variety called *minor* which is smaller in all its parts.

Culture &c. as above. Seeds freely produced.

H. hookerianum (*H. oblongifolium*). A half-hardy evergreen 2 ft. high, native of Nepaul, with round, shrubby stems. Leaves elliptic-lance-shaped, crowded, slightly revolute at the edges, full of pellucid dots. Flowers in summer, large.

Culture &c. as above. Seeds freely produced.

H. japonicum.—A Japanese species about 1 ft. high, with weak, 4-angled, smooth, decumbent stems. Leaves broadly ovate, mucronate, blunt, with revolute edges, full of pellucid dots. Flowers in spring, small, in loose panicles.

Culture &c. as above.

H. kalmianum. — A North American species 2–4 ft. high, with 4-angled stems, and linear lance-shaped leaves. Flowers in summer, 3–7 in a terminal corymb-like cluster.

Culture &c. as above. Seeds freely.

H. moserianum. — This is a hybrid between *H. calycinum* and *H. patulum*, and has become very popular of late years. There is a beautiful variegated form called *tricolor*, the leaves of which are blotched with white, green, and rosy-carmine.

Culture &c. as above, p. 265.

H. nummularium.—A Pyrenean species 3–6 in. high, with round ascending stems, and roundish stalked leaves. Flowers in summer, racemose.

Culture &c. as above, p. 265.

H. orientale.—A native of the Levant, 6–12 in. high, with erect, slender, 2-angled stems. Leaves stem-clasping, linear, blunt, erect, fringed with glandular hairs. Flowers in summer.

Culture &c. as above, p. 265.

H. patulum.—A Japanese species 6 ft. high, with round, purplish, herbaceous stems. Leaves ovate lance-shaped, acute, tapering to the base, revolute at the edges, without dots.

Culture &c. as above. Seeds freely produced.

H. perforatum (*Common St. John's Wort*). — A native of the copses and hedge-banks in the British Islands, and also distributed in the north temperate regions. It grows about 3 ft. high and has slender brown stems. Leaves sessile, oblong, with pellucid dots and occasionally a few black ones beneath. Flowers from July to September, 1 in. across; sepals lance-shaped acute, entire, with a few glandular lines or dots.

Culture &c. as above. Seeds freely produced.

H. prolificum. — A round-stemmed species with angular branches, 1–2 ft. high, native of N. America. Leaves linear lance-shaped, with revolute edges, full of pellucid dots. Flowers in summer, corymbose. *H. densiflorum* is closely related, but has narrower leaves and smaller flowers.

Culture &c. as above. Seeds freely produced.

H. pyramidatum. — A N. American species 4 ft. high, with winged herbaceous stems. Leaves stem-clasping, oblong-lance-shaped, acute, with revolute edges. Flowers in summer, large, on short thick stalks.

Culture &c. as above, p. 265.

H. triflorum.—A half-hardy smooth-stemmed species, native of the mountains of Java. Leaves membranous, ovate-oblong; bluntish, full of pellucid dots. Flowers in summer, solitary, usually in threes on terminal stalks.

Culture &c. as above, p. 265.

H. uralum.—A native of Nepaul 2 ft. high, with 2-edged compressed branches. Leaves elliptic, abruptly pointed, smooth, shining. Flowers in summer, terminal, somewhat corymbose.

Culture &c. as above, p. 265.

XXIII. TERNSTRŒMIACEÆ—Camellia Order

An order containing over 30 genera and 260 species of trees and shrubs, rarely climbers. Leaves alternate, rarely opposite, simple and entire or rarely digitately 3–5-lobed, or often serrate, leathery, penni-nerved. Stipules none, or very rarely, minute, and very caducous. Flowers regular, hermaphrodite, or rarely diclinous. Sepals 5, rarely 4, or 6–7, free, or slightly cohering at the base, imbricate, the inner ones often larger. Petals 5, rarely 4, or 6–9, hypogynous, free or often cohering in a short tube or ring at the base, much imbricated or twisted. Stamens usually numerous, rarely equal in number to the petals, hypogynous, free or often connate with each other at the base, or adnate to the base of the corolla. Disc none. Ovary free. Peduncles 1- or many-flowered; or flowers in terminal or axillary racemes, rarely in elongated panicles, often with 2 bracteoles beneath the calyx.

ACTINIDIA.—A genus containing about 8 species of ornamental, climbing, smooth, stiffly hairy or woolly shrubs, with entire or serrate leaves often membranaceous, penni-nerved. Flowers polygamous or diœcious. Sepals 5, slightly imbricate, somewhat connate at the base. Petals 5, rather twisted, imbricate. Stamens numerous, with versatile anthers.

Culture and Propagation.—Actinidias thrive in a light, rich, loamy soil in warm situations, and are excellent for trailing over walls, trellises, arbours &c. They may be increased by seeds sown in gentle heat under glass, or the shoots may be layered during the summer and autumn months. Cuttings of the ripened shoots may also be rooted in the autumn in sandy soil under a bell glass and grown on during the winter months under the protection of a cold frame or greenhouse.

A. Kolomikta. — A beautiful species from N.E. Asia, with ovate-oblong, stalked serrate leaves, rounded or somewhat cordate at the base, and tapering to a lŏng point, very beautiful in autumn, changing to red and white. Flowers in summer, white, ½ in. across, solitary, axillary or cymose, the stalks being covered with fluffy white down.

Culture &c. as above.

A. polygama.—A Japanese species, with heart-shaped, serrate, reddish-stalked leaves about 8 in. long, and fragrant white flowers in June and July, drooping from the leaf axils and succeeded by edible berries in the autumn months.

Culture &c. as above.

A. volubilis.—A free-growing Japanese climber, with oval and elliptic leaves, and small white flowers in June.

Culture &c. as above.

STACHYURUS.—A genus containing only 2 species of smooth shrubs or small trees with membranous serrate leaves and small flowers in lateral spikes or racemes. Sepals and petals 4 each. Stamens 8, free. Fruit a 4-celled berry.

S. præcox.—A Chinese and Japanese shrub with flexible stems 9–10 ft. high, furnished with bright more or less oval-lance-shaped tapering leaves 4–6 in. long, with serrulate edges. The small greenish-yellow flowers are freely borne in short axillary clusters early in March, before the leaves are developed.

Culture and Propagation.—This plant flourishes in ordinary good and well-drained garden soil, and may be utilised like the Actinidias for clothing a south wall which will give it the necessary protection from cold winds. It may be easily increased by cuttings of the ripened or half-ripened shoots in August and September, placed in sandy soil under a handlight and protected until the following spring from the severities of winter.

STUARTIA. — A genus containing 8 species of beautiful shrubs, with membranous deciduous leaves, and shortly stalked, solitary, axillary flowers. Sepals and petals 5, rarely 6, the latter imbricate, cohering at the base. Stamens numerous, adhering to the base of the petals; anthers versatile. Styles 5, distinct, or connate.

Culture and Propagation. — Stuartias thrive in a peaty and loamy soil, and in the milder parts of the country make handsome shrubs. In less favoured parts they should be protected from the north and east winds by hardier trees and shrubs, as the young shoots are apt to be injured by severe frosts. A warm and sunny position is essential for the thorough ripening of the growths.

The plants may be increased by layering the lower branches, or by putting cuttings of ripened wood in sandy soil under a bell glass during the late summer and autumn months.

S. pentagyna (*Malachodendron ovatum*).—A somewhat slow-growing species about 10 ft. high, native of N. America, with ovate-acute leaves. Flowers from May to July, creamy-white, with 5–6 sepals and petals, the latter being obovate with jagged edges and a purplish downy outer surface.

Culture &c. as above.

S. Pseudo-camellia (*S. grandiflora*). A beautiful Japanese shrub, about 12 feet high. Leaves ovate-elliptic, shortly toothed, pointed, narrowed into a reddish stalk. Flowers in summer, creamy-white, with finely serrulate dull reddish-brown sepals.

Culture &c. as above.

S. virginica.—A rounded and spreading bush 6–10 ft. high, native of N. America, with oblong-ovate, serrulate leaves, softly downy beneath. Flowers in early summer, white, about 3 in. across, with crimson-red stamens. Sepals ovate; petals 5, roundish-obovate.

Culture &c. as above.

GORDONIA (Loblolly Bay). — A genus containing 10 species of evergreen trees or shrubs with entire or crenate leaves. Peduncles solitary, 1-flowered.

Sepals usually 5, unequal. Petals free, or slightly connate at the base, much imbricated, the inner ones larger. Stamens numerous, often in 5 bundles, or united in a ring and adnate to the petals.

Culture and Propagation. — The species mentioned below are the only ones grown out of doors in the British Islands, and, although they have been introduced more than a century and a half, are still very little known. This is owing chiefly to the fact that they are not readily increased, either by seeds or layers—the methods of propagation usually adopted. They thrive in light peaty soil with plenty of leaf mould in it, and should be placed in the most sheltered and warmest parts of the garden.

As seeds are very rarely produced in our climate, it is not possible to obtain plants by that means very often. Imported seeds should be sown immediately on arrival, in light sandy peat and leaf soil, and placed in gentle heat. Layers may be made during the summer and autumn months, and cuttings of the ripened shoots may also be inserted in moist sandy peat and loam, either in gentle heat (which is best) or under a handlight.

G. Lasianthus.—A beautiful Camellia-like shrub 8–10 ft. high, native of the sea-coast swamps of the S. United States. Leaves oblong, smooth, serrated, leathery. Flowers from July to September, white, about 4 in. across, fragrant, borne in the axils of the leaves.

Culture &c. as above.

G. pubescens. — A slightly dwarfer species from the same region, with obovate-lance-shaped, somewhat serrated leaves, downy beneath. Flowers late in summer, white, about 3 in. across, fragrant, with a bundle of conspicuous golden-yellow stamens in the centre.

Culture &c. as above.

CAMELLIA.—A genus which includes over a dozen species of beautiful evergreen trees and shrubs, with serrated, leathery or membranous shining green leaves. Flowers axillary, solitary or clustered, sessile or shortly stalked, showy. Sepals 5–6, unequal, gradually passing from bracteoles to petals; the latter slightly cohering at the base, much imbricated. Stamens numerous, many of the outer ones cohering and attached to the base of the petals; inner ones free.

Camellias, although usually grown in cool greenhouses, are in reality hardier plants than is generally supposed. From the Thames Valley southwards, and in favourable parts of the south-west of Scotland and Ireland, they are practically hardy. Indeed during the severe frosts of the winters of 1879–80 and 1880–81 Camellias in widely distant parts of the country (Wales, Isle of Wight, Dorset, Argyllshire, Surrey, Cornwall &c.) were quite uninjured by frosts, although in many parts well-favoured geographically the plants were injured. Altitude, exposure, soil and drainage would account for this, however, in many cases.

Culture and Propagation. — Camellias like a good rich compost of sandy peat and loam, and should never be allowed to get too dry at the roots, as the flowers are likely to drop as a consequence. The plants are greatly benefited by a daily syringe during the summer time —either early in the morning or late in the afternoon. If the water is applied with some force from a hose pipe, the stems and leaves are kept beautifully clean, and the flower buds become plumper, and are more likely to develop, than if the plants are not attended to.

The best position for the Camellia is facing north or north-west, with a wall or hedge in the background for protection from fierce cold winds, which seem to do a good deal of mischief. If low-growing hardy shrubs like *Osmanthus*, *Olearia* &c. are planted in front of them, they are a great protection to the stems and roots, which are often more affected by biting winds than the foliage. A shady position, but one at the same time fully exposed and well ventilated, is best for outdoor Camellias, as they do not like the scorching heat and bright sunshine of summer.

As the wood is fairly well-ripened by July, that is the best time for planting—either from pots or the open ground. Have the hole sufficiently large to admit of the roots being evenly spread over the surface and not crumpled up in a ball. In this way the soil will get in among the roots properly, new ones will develop more rapidly, and thus enable the plants to become well established before the winter. Planting is always best done in dull showery weather, so that the plants will not suffer too much by the evaporation of moisture from the foliage. If planting takes place in dry sunny weather, the soil should be well watered and the plants should also be well syringed daily, early in the morning and late in the afternoon, and until they are well established it may be advisable to shade them during the hottest portion of the day with a covering of thin canvas or some other light material. The way to plants trees properly is shown in the diagram at p. 1082.

Single-flowered Camellias may be increased by seeds, layers, or cuttings, the two latter methods being used for the double and variegated kinds. Cuttings are best taken in August, and inserted in sandy peat and loam in a cold shaded frame. By the following spring those that have rooted will begin to grow. They should then be potted off singly in a similar compost and kept in a close frame for a time and well syringed until well established, when they may have plenty of air to ripen the wood. Camellias are also grafted or 'inarched' in early spring when growth begins upon stocks of the common variety of *C. japonica* which are raised from cuttings. Without the aid of a greenhouse, however, it is not worth while for the amateur to raise his own plants. He will get them much better and cheaper from a nurseryman.

Most of the Camellias seen in gardens are varieties of *C. japonica*, but other species also are here described.

C. euryoides.—A hairy, branched Chinese species, about 4 ft. high, with ovate lance-shaped, pointed leaves, serrated on the edges, and silky beneath. Flowers from May to July, white.

Culture &c. as above. This plant is very rarely seen.

C. japonica.—A lovely tree about 20 ft. high, native of Japan and China, with ovate, pointed, sharply serrated leaves. In a wild state the flowers are red, resembling those of the Wild Rose.

This species was introduced to Europe in 1739 by Lord Petre, but the double-flowered forms did not appear until 1792 onwards. The variety *anemonæflora* has nearly all the stamens transformed into small incurved petals, which give the flower a likeness to a double Anemone.

Among the many varieties of *C. japonica*, the following are probably best for outdoor culture, but others may be equally good, if not better:—

alba plena, double white; *Chandleri elegans*, large, light rose; *Donckelaari*, large semi-double, rich crimson, marbled white; *fimbriata alba*, white petals notched at edges; *imbricata*, deep carmine, occasionally variegated; *Lady Hume's Blush*, very free, good form, flesh colour; *Mathotiana*, brilliant red, and *Mathotiana alba*, white; *Lavinia Maggi*, pure white, flamed with cerise; *Countess of Orkney*, white, striped with carmine, sometimes pink, shaded with deep rose.

Culture &c. as above.

C. reticulata.—A fine Chinese shrub about 10 ft. high, with oblong pointed, serrated, net-veined leaves, and large semi-double bright rose flowers. There is also a full double-flowered form, and it is possible that many of the garden forms are derived from this species.

Culture &c. as above. This species must be grown in warm, sheltered, and sunny situations as it does not like exposure to cold winds.

XXIV. MALVACEÆ—Mallow Order

An extensive order (about 60 genera and 700 species) of herbs, shrubs, or rarely trees, with stellate hairs. Leaves alternate, usually palminerved, more or less divided, stipulate. Peduncles axillary and one-flowered, in fascicled racemes or panicles. Flowers regular, hermaphrodite, rarely diœcious or polygamous. Sepals 5, rarely 3–4, more or less united at the base. Petals 5, hypogynous, twisted in bud, free, or adhering to the base of the stamen tube. Stamens many, hypogynous, filaments more or less united, rarely free. Disc small, sometimes growing up between the numerous carpels. Fruit dry or rarely berry-like, the carpels often united and forming a fruit known as a carcerule (see Glossary, fig. 27).

MALOPE.—A genus containing only 3 species of little-known smooth or hairy ornamental annuals, with entire or 3-cleft leaves. Flowers stalked, violet or rose, with 3 large heart-shaped bracteoles. Calyx 5-lobed, persistent. Stamen-tube divided into numerous filaments.

Culture and Propagation.—Malopes thrive best in sandy loam, in sunny situations, but are not fastidious. They may be raised from seeds sown in slight heat in March, or in the open border at the end of April. The latter method is better on the whole, as the seedlings do not stand transplanting from seed pots very well. When sown in the open border they may simply be thinned out 6–9 in. apart. During the summer months they require to be frequently watered as they absorb and exhale moisture very freely. They look more effective in masses or groups.

M. malacoides.—A native of South Europe, about 1 ft. high, with oblong-ovate, crenate or pinnatifid leaves, wedge- or heart-shaped at the base. Flowers in summer, large, rose-pink, tinged with purple.

Culture &c. as above.

M. trifida.—A beautiful annual 1–3 ft. high, native of S. Spain. Leaves 3-cleft, toothed, smooth, with pointed lobes. Flowers from July to September, large, solitary, purple, or white as in the variety *alba*. The variety *grandiflora* is a well-known and more vigorous plant with crimson flowers, of which there are red and white variations.

KITAIBELIA.—A genus with only one species here described:—

K. vitifolia.—A perennial herb 6–8 ft. high, native of E. Europe. Leaves Vine-like, 5-lobed, acute, toothed. Flowers late in summer, stalked in the axils of the upper leaves, large, showy, white or rose. Calyx 5-lobed, with 6–9 united bracts. Stamen-tube divided into numerous filaments.

Culture and Propagation. — This species thrives in any garden soil and is easily increased by dividing the rootstock after flowering. Seeds are produced freely and may be sown as soon as ripe in cold frames or in gentle heat in greenhouses. The seedlings should be pricked out into boxes or pans, or into fine sandy soil in cold frames, giving them protection from frost until the following spring, when they may be transferred to the open border The seeds may also be sown either in gentle heat early in spring or in the open ground during April and May.

PALAVA.—A small genus containing only 3 species of rather smooth or woolly annual herbs, natives of Chili and Peru, with leaves often lobed, sinuate, or dissected. Flowers stalked, axillary, solitary, purple. Calyx 5-cleft. Stamen-tube divided into numerous filaments.

Culture and Propagation. — Palavas thrive in ordinary soil. Seeds may be sown in a little heat in March, so that the seedlings will be ready for transplanting by the end of May. Or seeds may be sown in the open border in April, afterwards thinning the seedlings out 6–9 in. apart.

P. flexuosa. — A pretty slender-stemmed annual about 1 ft. high, with twice pinnatifid, hairy, stalked leaves 2–4 in. long. Flowers in summer, light mauve or lilac, paler in the centre, with bright red anthers; petals red and sepals purple at the base. This species is also known as *Palava dissecta*. It seeds freely in the British Islands, and in warm favourable localities would probably reproduce itself annually from self-sown seeds.

Culture &c. as above.

P. rhombifolia.—A somewhat prostrate hairy species with soft rhomboid leaves, about 2 in. long. Flowers in July and August, rose-purple, about 1 in. across, scentless.

Culture &c. as above.

ALTHÆA. — This genus contains about a dozen species of more or less well-known tall or dwarf woolly or hairy biennials or perennials with lobed leaves, and usually solitary, axillary or racemose flowers variously coloured. Bracteoles of the involucre or outer calyx 6-9-cleft, united at the base. Calyx 5-cleft. Stamen-tube divided into numerous filaments. Carpels in a regular whorl, 1-seeded, indehiscent.

Culture and Propagation. — Most of the plants thrive in almost any garden soil, and being of somewhat coarse and vigorous growth are suitable for shrubberies or the rougher parts of the flower garden. The perennial species may be increased in early autumn or in spring by dividing the rootstocks carefully. They may also be multiplied by sowing the seeds as soon as ripe either in a warm border or in a cold frame, afterwards thinning the seedlings out, or pricking them out into light rich soil at least before the end of September. The cultivation of the Hollyhock will be dealt with separately under the species from which it has been derived, viz. *A. rosea*, and as a matter of fact the other species described may be cultivated in the same way.

A. cannabina. — A perennial 5–6 ft. high, native of S. France. Leaves downy, lower ones palmately parted, upper ones 3-parted, lobes narrow, teeth coarse. Flowers in summer, rose.

Culture &c. as above. Increased by seeds or division.

A. caribæa.—A hairy-stemmed biennial about 3 ft. high, native of the Caribbee Islands. Leaves heart-shaped, roundish, lobed, crenate-serrate. Flowers in spring, rosy, with a yellow base.

Culture &c. as above and for *A. rosea* below.

A. ficifolia (*Antwerp Hollyhock*). — A stout and vigorous Siberian biennial 6–10 ft. high, with somewhat open hand-shaped leaves, irregularly toothed on the edges. Flowers in summer, red or yellow or orange, large, single or double.

Culture &c. as above and for *A. rosea* below.

A. flexuosa.—A perennial 2–3 ft. high, native of N. India, with long-stalked, cordate, 7-lobed leaves. Flowers in summer, scarlet, solitary; petals obcordate.

Culture &c. as above and for *A. rosea* below.

A. narbonensis. — A strong-growing perennial 3–6 ft. high, native of France and Spain. Leaves downy, serrated, lower ones 5–7-lobed. Flowers in August, pale red, on many-flowered stalks.

Culture &c. as above and for *A. rosea* below. This plant is closely related to *A. cannabina*, and is practically a botanical form of it, although distinct enough for garden purposes.

A. officinalis (*Common Marsh Mallow; Guimauve*). — A well-known British marsh plant 3–4 ft. high, with soft, woolly, heart-shaped or ovate, toothed, undivided, or slightly 5-lobed leaves, and flowers in summer of a delicate blush colour.

Culture &c. as above. This species is useful for associating with bog or marsh plants, and therefore requires to be grown in moister soil than the other species.

A. rosea (*Hollyhock*). — The wild Hollyhock is a straight-stemmed, hairy perennial 6–10 ft. or more high, native of China. Leaves rough, heart-shaped, with 5–7 crenated angles or lobes. Flowers in summer, rosy, large, axillary, without stalks, somewhat spiked at the top.

The cultivated Hollyhock, which has been derived in almost innumerable varieties from this species, and has been grown for more than 300 years, is one of the most beautiful and noble-looking of hardy plants. From 35 to 40 years ago it was extensively cultivated, and from July to the end of September was a feature at horticultural exhibitions. There were the English and Scottish types, the former having small closely set flowers, with neat, well-filled centres and narrow 'guard-petals'; the latter large flowers, wide guard-petals, and smaller centres indented with openings called 'pockets.' The two types were crossed with each other, and a new race—that now most generally seen—was the result.

Soil.—Hollyhocks like a deep, rich, loamy soil, well enriched with farmyard manure. About the end of March is the best time for planting, the ground having previously been well trenched or dug. During the hot summer months the plants should have plenty of water. A mulching of well-rotted manure will greatly assist in keeping the moisture in the soil, and prevent its being baked by the fierce rays of the sun. Plenty of moisture at the root in summer and dryness in winter suit Hollyhocks best.

Propagation.—Hollyhocks may be increased by seeds, cuttings, or by carefully dividing the rootstock; also by 'eyes,' that is buds, taken with a portion of the older stem, usually during July and August. By seed is probably the easiest and most natural method, and there is always a chance of obtaining some really fine varieties, whereas the other methods simply reproduce their parents. Seeds have the further advantage of requiring no glass protection; and on the whole plants obtained by this means are not nearly so liable to attacks of the dreaded Hollyhock disease as plants raised from cuttings that have been rooted in heat. The seeds may be sown in the open border in May, and the seedlings may be afterwards pricked out about 6 in. apart in a prepared bed of fine soil. About the first or second week in September they may be transplanted to the spot in which they are to bloom the following year, and there should be at least 8 ft. between the plants in the beds or borders. If planted too close to each other, a good circulation of air is prevented, and this in itself is favourable to the development of the Hollyhock disease mentioned below.

Cuttings are taken in the summer and autumn by cutting out the matured side shoots, or from shoots at the base of the stem. They may be inserted in sandy soil either singly in small pots, or several in a shallow box or pan, and placed at first in a close shaded frame, a little air being given after a few days. As the plants become well rooted and established, they should receive all the air and light possible so that they may never be subject to a damp and sluggish atmosphere.

General Remarks.—Although vigorous Hollyhocks will shoot their strong stems up to a height of 8 to 12 ft. they are liable if at all exposed to strong winds to be blown about, and more or less spoiled. It is advisable therefore to supply stoutish stakes 4–6 ft. high at the time of planting, so as to prevent injury to the roots at a later period. As the stems lengthen they may be tied to the stakes with a piece of raffia or tar twine. The tie should first of all be made firmly round the stake at the desired height so that it will not slip up and down. The loop of the tie may then be left large enough for the stem, but not so tight as to cut into the bark.

As the lower flowers, which open first, begin to fade, the petals only should be removed if seeds are required, leaving the pods to ripen; but if not, the pod and all may be removed for the sake of a tidy appearance. The spikes themselves, if cut and placed in water, will retain their freshness for a considerable time and the flowers will continue to open. By frequently cutting a piece off the bottom of the stem the blossoms last longer.

When the flowers, seed-pods, and leaves have finished their season's work, the plants may be cut down to within 6 in. of the ground, and the soil may be raised a little around the crowns to throw off the cold rains of winter, which are injurious if not drained away from the roots. In this protected state the root-stocks pass through severe winters safely, and make vigorous shoots the following spring. Treated in this way plants will continue to flower profusely for several years without being disturbed, but it is always safe to raise a stock of young plants regularly by one or other of the methods described above.

Insect Pests.—In hot weather red-spider is apt to be very troublesome to the foliage, if the plants have not been frequently syringed. A daily application of water to the leaves, and particularly the under surface, will keep this pest away, and also serve to water the plants. Thrips are also fond of the Hollyhock, but may be checked by the same means. In the early stages of growth the spittle-fly is somewhat mischievous, but is easily destroyed between the finger and thumb.

The Hollyhock Fungus (*Puccinia malvacearum*) is by far the most serious disease the gardener has to cope with. It is a native of Chili, whence it was introduced to Europe about 1869, and in 4 or 5 years had spread with great rapidity, dealing destruction all round to Hollyhocks in England, France, Germany, Holland, Hungary and parts of Italy.

The fungus appears in early summer in yellow or orange spots on the leaves—usually the under surface—and stems of the Hollyhock. The spots rapidly increase in size, becoming brown in colour, and when in great profusion interfere with the work of the leaves to such an extent that the flower-forming material is either checked or absorbed by the parasite with the natural consequence that the flowers never develop and the constitution of the entire plant is ruined.

When a hardy plant like the Hollyhock is increased in large numbers with the aid of artificial heat, it is not unnatural that its once hardy constitution should undergo a change, become more delicate in fact, and thus be unable to resist the attacks of its natural enemies. Where Hollyhocks are allowed to stand in the garden without any protection winter after winter, as they do in many cottagers' gardens, the Hollyhock fungus rarely or never makes its appearance. But on plants that have been raised from seeds or cuttings in heat, and protected in frames in winter it is almost sure to find a congenial home. One of the best and most natural preventives therefore against the fungus is to grow the plants without any protection whatever, but taking all necessary precautions to keep the soil clean, rich, and well-drained.

Remedies.—Many have been tried to rid the plants of the fungus, but they have been practically useless, except for a short time. Washes of soft soap and sulphur seem to have been useful in the early stages of the fungus, but not afterwards. Perhaps one of the best remedies for plants seriously attacked is to dissolve some permanganate of potash in almost boiling water, and spray the plants thoroughly with this by means of a very fine syringe. The water will lose much of its heat in transit from the syringe to the plant, and the tiny globules of water on the surface will be further cooled by the surrounding air, so that the actual temperature of the water when it strikes the fungus will probably not exceed 150° Fahr., and the sudden increase in temperature will probably kill the fungus outright. This suggestion must not be considered as tantamount to dipping the plant in boiling water. It has proved efficacious in the case of mildew on Vines in fruit without the slightest injury to the foliage, and if properly done should also be of service to the Hollyhock. If the plants are in a really bad condition and beyond all hope, it is safer to take them up carefully and without shaking them about violently so as to spread the fungus spores, and have them burned. If other plants are to take their place, the soil into which they are to go should be well watered a day or two beforehand with boiling water. This will kill any of the fungus spores which may be lurking in the crevices of the soil.

LAVATERA (Tree Mallow).—A genus containing about 18 species of woolly or hairy trees or shrubs, with angled or lobed leaves, and flowers axillary, solitary, or in terminal racemes. Bracteoles of the involucre 3-6 cohering about half way up. Calyx 5-lobed. Stamen-tube divided into numerous filaments.

L. arborea.—A stout-growing downy shrub 6–10 ft. high, native of British and S. European coasts. Leaves long-stalked, roundish, with 5–9 broad, short lobes. Flowers late in summer, about 2 in. across, purple, glossy. The form known as *variegata* is a very beautiful plant with variegated leaves, the surface of which is handsomely marbled with yellow and yellowish-white on a grey-green ground.

Culture and Propagation.—This species is best raised from seeds every year. They may be sown out of doors in April and May, or raised in gentle heat about March so that the seedlings will be ready for the open ground at the end of May. Plants raised the first year do not attain great dimensions, and it is better to keep them until the second so that they may appear at their best. In cold and unfavourable parts of the kingdom they will not stand severe winters, and in such places they must be wintered in a greenhouse or cold frame. The variegated form, which is the most popular, and is much used for sub-tropical gardening, is more tender than the green-leaved type, and consequently requires even greater protection in winter.

L. Olbia.—A rough-stemmed shrub about 6 ft. high, native of Provence, but now naturalised in some parts of the British Islands. Leaves soft, woolly, 3-5-lobed, the uppermost leaves oblong, almost entire. Flowers from June to October, reddish-purple, solitary, on short stalks.

Culture &c. as above for *L. arborea*. This species likes a light rich soil in open sunny situations, and during the summer months should be frequently watered.

L. trimestris.—A beautiful annual 3–6 ft. high, native of S. Europe, Asia Minor &c. Leaves smoothish, roundish, heart-shaped, upper ones lobed. The solitary flowers 2–3 in. across are freely produced from the beginning of July to October, and are of a beautiful transparent rose, with deeper coloured veins, and a purple blotch at the base of the petals. There is also a white-flowered variety, *alba*.

Culture and Propagation.—This fine species may be raised from seeds sown annually either in gentle heat in March, or in the open border, where the plants are to bloom, in April and May. In the first case the seedlings must be pricked out and grown on till the end of May or beginning of June before transferring them to the outdoor garden. In the second they need only be thinned out 12 to 18 in. apart. In hot dry seasons they like plenty of water at the root. The white-flowered form of *L. trimestris* is very pretty.

L. unguiculata.—A woolly-stemmed, shrubby perennial, native of S.E. Europe, with acutely 3-5-lobed woolly leaves. Flowers in late summer, light rosy-lilac, about 3 in. across, axillary, on short stalks.

Culture &c. as above for *L. arborea.*

MALVA (MALLOW).—A genus of 16 species of smooth or hairy annual, biennial, or perennial herbs, with leaves often angled, lobed, or dissected. Flowers solitary or clustered, stalked or unstalked, or rarely in terminal racemes. Bracteoles 3, distinct; calyx 5-lobed, stamen-tube divided at the apex into numerous filaments.

Culture and Propagation. — The species described below are the only ones worth growing. They thrive in any fairly good garden soil, and may be used in borders, shrubberies or the wild garden. The annual kinds are raised from seeds; the perennials also, and by cuttings.

M. Alcea. — A European perennial about 4 ft. high, with light green, downy leaves palmately lobed and cut. Flowers in summer, about 2 in. across, pale rose-purple. The variety *fastigiata* (also known as *M. Morenii*) is a native of Italy, 2–3 ft. high, with lobed and toothed leaves, and red flowers produced from July to October.

Culture &c. as above. This species flourishes in ordinary good garden soil in warm sheltered positions, and seeds freely. It may be increased by sowing the seeds as soon as ripe in a cold frame, afterwards pricking the seedlings out when large enough into light rich soil in the frames, or in shallow pans or boxes. They are best kept under protection during the winter months, giving as much air and light as possible, however, on all occasions except in frosty weather. By the end of May or June they will be ready to plant in the outdoor garden 12–18 in. apart. In the milder parts of the kingdom seeds may also be sown in the open border in April and May. During the summer months cuttings of the side shoots may be rooted in sandy soil under handlights and wintered in cold frames.

M. crispa.—An erect annual 2–6 ft. high, found naturalised in many countries but probably a native of China. Leaves smooth, angular, toothed, curled. Flowers in summer, white, pale purple at the tip, axillary, and almost or quite stalkless.

Culture &c. as above. This plant is highly ornamental owing to the pretty appearance of the crisp-edged leaves and bushy habit. It likes a rich well-drained soil and partially shaded situations with plenty of water during the hot summer months. It may be raised from seeds sown in gentle heat in March, pricking the seedlings out and transplanting at the end of May. Seeds may also be sown in the open border in April, and the seedlings afterwards thinned out about 2–3 ft. apart. In warmer parts of the kingdom seedlings will come up annually from self-sown seeds in autumn.

M. mauritiana.—An erect annual 4–6 ft. high, native of N. Africa and South Europe, with obtusely 5-lobed leaves, and numerous deep purple flowers in June.

Culture &c. as above for *M. crispa.*

M. miniata.—A bushy Mexican species 1½–2 ft. high, having oval 3-lobed toothed leaves, and axillary flowers of bright red or orange-red, borne in erect spikes from June onwards until cut down by frost.

Culture and Propagation. — This species, owing to the vivid colouring of its flowers, makes a very effective border plant when grown in masses. Although really perennial, it is scarcely hardy enough to stand out of doors during the winter months except in the very mildest parts of the south and west. It should therefore be raised from seeds and cuttings annually in the same way as *M. Alcea* above.

M. moschata (*Musk Mallow*).—A handsome British perennial 2–3 ft. high. Lower leaves kidney-shaped, cut; upper ones with 5 deeply pinnatifid, jagged segments. Flowers in summer, about 2 in. across, rose, in terminal and axillary clusters. The variety *alba* has beautiful pure white flowers.

Culture &c. as above for *M. Alcea.*

CALLIRHOE.—A small genus containing about 7 species of elegant annual or perennial herbs, all natives of North America, usually with lobed or parted leaves, and similar in growth to the Mallows. Bracteoles 1–3, distinct, or none. Calyx 5-lobed. Stamen-tube divided at the apex into numerous filaments.

Culture and Propagation.—They may be grown and increased in the same way as the Mallows, and as mentioned below.

C. alcæoides. — An erect perennial species 2–3 ft. high, with deeply lobed leaves and rosy flowers about 1½ in. across borne during the summer and autumn months.

Culture &c. as for *C. digitata.*

C. digitata (*Nuttallia digitata*).—A glaucous perennial 2–3 ft. high, with somewhat peltate 6–7 parted leaves, cut into linear entire or 2-parted segments. Flowers in summer, reddish-purple, on long stalks.

Culture and Propagation. — This species thrives in ordinary well-drained garden soil, and likes rather warm sunny situations with plenty of moisture at the root during the summer months. It may be increased by sowing seeds as soon as ripe in cold frames, afterwards pricking the seedlings out and growing on in frames until the following April or May, when they may be planted out in mild showery weather. Seeds may also be sown out of doors in April and May in the milder parts of the country, but the plants will not bloom till late in the season. Cuttings of the side shoots may also be rooted in cold frames or under handlights during the summer months, and will make good strong plants by the following spring.

C. involucrata (*Malva involucrata*). A hairy-stemmed, procumbent perennial about 6 in. high, with leaves divided almost to the base, 3–5-parted; segments narrow lance-shaped, 3–5-toothed. Flowers in summer, about 2 in. across, crimson, shading off into white at the base, in the centre of which is a cluster of bright yellow-anthered stamens surrounding purple stigmas.

Culture and Propagation.—Although, if allowed to ramble over the surface of the soil, this plant only reaches a height of about 6 in., its stems nevertheless are 2–3 ft. long. They may be trained on a trellis or against a wall if desired, or if allowed to grow naturally the plant might be placed on a mound so as to allow the stems to trail downwards all round. They may be kept in position by a few pegs here and there. Seeds are freely produced and may be sown as soon as ripe in cold frames or in spring in gentle heat. The seedlings may be planted out about the end of May. Being a native of Texas, and rather too tender to stand our winters except in the mildest parts of the south and west, propagation by seeds is the easiest method of increase for plants to be grown in the open air.

C. macrorhiza.—A thick-rooted perennial 2–3 ft. high, bearing erect racemes of purple-carmine flowers during the summer and autumn months. There are several shades of colour, including pale rose and rose-purple, but the white-flowered variety is very pretty.

Culture &c. as above for *C. involucrata.*

C. Papaver (*Nuttallia Papaver*). — *Poppy Mallow.*—A somewhat trailing perennial about 3 ft. high, with lower leaves lobed or pedate, the others being palmate-pedate or digitate or simple as they ascend the stem. Flowers from early summer to late autumn, bright purple-red, with ovate-acute fringed sepals.

Culture &c. as above for *C. involucrata.*

C. pedata.—A pretty trailing perennial (although usually treated as an annual) 2–3 ft. high, with laciniately pedate and trifid leaves, and panicles of cherry-red flowers each about 2 inches across produced during the summer and autumn months. The varieties *compacta* and *nana* are dwarfer and more compact in growth than the type.

Culture &c. as above for *C. involucrata.*

SIDALCEA.—A genus containing about 8 species of perennial herbs, like Mallows and Hollyhocks in growth, and with lobed and parted leaves. Flowers shortly stalked or sessile, in racemes or terminal spikes. Bracteoles none. Calyx 5-lobed. Stamen-tube doubled at the apex, the outer portion divided into 5 anther-bearing bundles, the inner into numerous filaments.

S. candida. — A native of Colorado, 2–3 ft. high, with roundish, glossy, 7-lobed, long-stalked leaves. Flowers in summer, white, freely produced in terminal racemes.

Culture and Propagation. — This species will flourish in ordinary good garden soil in open sunny situations and likes plenty of water at the roots during the summer months. Although a true perennial it is best raised from seeds sown every year as soon as ripe in cold frames, or in spring in the same way, or in gentle heat. The seedlings must be pricked out so as to have space enough to develop into bushy plants. Those from summer or autumn seeds flower earlier and are finer plants than those raised from seeds in the spring. The latter bloom later in the season. Where the plants are not killed by winter frosts they may also be increased by division in early autumn or in spring, but seedling plants are usually more satisfactory.

S. malvæflora (*Callirhoe spicata*).—A slender, twiggy-stemmed species about 2-3 ft. high, native of Texas. Lower leaves roundish, 5-9-lobed and cut, the others variously lobed, cut, and toothed, the upper ones being almost entire. Flowers in summer, lilac or pale rose, less than 2 in. across, numerous. The variety *Listeri* has beautifully fringed pale pink flowers, borne on tall graceful spikes.

Culture &c. as above.

MALVASTRUM. — A genus containing 60-80 species of erect dwarf or trailing herbs or undershrubs resembling the Malvas and Sidas. Leaves various, entire, heart-shaped, or deeply lobed. Flowers scarlet, orange, or yellow, borne in the leaf axils or at the ends of the shoots. Bracteoles 1-3, small or none. Calyx 5-cleft. Stamen-tube divided into numerous filaments at the apex.

Culture and Propagation. — These plants flourish in warm sunny positions in ordinary good garden soil and are suitable for the herbaceous border or rock garden in the milder parts of the kingdom. Although more tender, on the whole they may be treated much in the same way as the Malvas, Sidalceas, and Callirhoes, and are increased by seeds sown as soon as ripe in cold frames or by cuttings of the side and basal shoots in autumn.

M. campanulatum (*Malva campanulata*).—A downy Chilian species 1-1½ ft. high, with large deeply lobed and divided leaves. Flowers late in summer, bright rose-purple, borne in long loose spikes at the ends of the shoots.

Culture &c. as above. This can only be considered hardy in the milder parts of the kingdom.

M. coccineum. — A native of the United States, about 6 in. high, with more or less deeply lobed blue-green leaves and trusses of scarlet flowers from July to September. The variety *grossulariæfolium* grows 1½-2 ft. high, and has strong hairy stems and leaves, and red flowers.

Culture &c. as above.

M. Gilliesi (*Modiola geranioides*).—A pretty plant about 6 in. high, native of temperate S. America. It has trailing stems and palmately lobed leaves, and during the summer months produces bright red flowers.

Culture &c. as above. This is best grown in rich sandy and well-drained loam in warm sunny parts of the rock garden. In low damp places it is often killed in winter.

M. lateritium (*Malva lateritia*). — A hairy perennial, native of Montevideo. Although the stems are only about 6-12 in. high, they trail as much on the ground before rising. The beautiful salmon-pink flowers, each about 1¼ in. across, with a purple blotch at the base of the petals, are borne in great profusion from June to September, singly on long stalks in the leaf axils.

Culture &c. as above. This species only ripens seed in hot favourable seasons. It may be, however, easily increased by severing the trailing stems which root at the joints, or by cuttings of the non-flowering shoots inserted in cold frames in autumn. These will produce sturdy plants by spring. Perfectly hardy only in the milder parts of the kingdom.

PLAGIANTHUS. — A genus containing about a dozen species of shrubs or rarely herbs with entire, sinuate, angulate, or rarely lobed leaves. Flowers often small, whitish, clustered in the leaf axils or in spikes at the ends of the shoots, rarely solitary, or arranged in short axillary panicles. Bracteoles none, or distant from the 5-toothed or lobed calyx. Stamen column divided at the apex into numerous filaments. Ovary usually 2-5-celled.

P. Lyalli.—A beautiful flowering shrub, native of New Zealand, where it attains a height of 20-30 ft. in the mountainous districts, and is said to be deciduous above an altitude of 3,000 ft., but evergreen below that level. The shortly stalked leaves are 2-4 in. long, ovate heart-shaped in outline, tapering at the apex, and deeply and doubly crenate on the margins. The pure white flowers 1½-2 in. across are borne in drooping clusters in June on the previous year's growths, and are remarkable for the conspicuous bundle of yellow anthers in the centre.

Culture and Propagation. — This handsome shrub will flourish in the open air in the milder parts of the kingdom, but is almost sure to be severely injured if not killed in hard winters in northern parts. It is best grown against a wall with a more or less southern aspect, although it succeeds well as a bush in the south of Ireland, Cornwall &c. It likes a rich and well-drained sandy loam with a little leaf soil and manure added, and a top dressing in winter or in spring when growth is being made will also be beneficial and induce the plants to flower profusely. After flowering—say during July—the old wood should be cut out where necessary and the young shoots trained in and exposed to the sun and air so as to ripen well for blooming the following year.

This species may be increased by inserting cuttings of the more or less ripened shoots in sandy soil under handlights in late summer and autumn. Sometimes only a few cuttings root, and the riper they are probably the better. The lower branches may also be layered in autumn, and detached the following year when well rooted.

There are a few other species of Plagianthus—all natives of New Zealand or Australia—known, but they are now rarely, if ever, seen in cultivation. The following may be mentioned:—*P. betulinus*, with Birch-like leaves and terminal panicles of small whitish flowers; *P. divaricatus*, a marsh plant with small narrow leaves and whitish flowers either solitary or in clusters; *P. Lampeni* with whitish-yellow flowers; *P. pulchellus*, a shrub 3-4 ft. high, with heart-shaped leaves and small whitish flowers.

SIDA (Indian Mallow). — A genus containing about 80 species of softly downy or woolly herbs or shrubs, with flowers sessile or stalked, solitary or clustered, axillary or in terminal heads, spikes, or racemes. Bracteoles none, or distant from the calyx. Calyx 5-toothed or lobed. Stamen-tube divided at the apex into numerous filaments.

The following are the only species suitable for outdoor cultivation, and may be treated like the Mallows, Callirhoë, and Sidalceas.

S. incarnata. — A showy Brazilian perennial about 2 ft. high, with smooth, deeply cut, and variously lobed and toothed leaves, fringed with short hairs. Flowers in summer, less than 2 in. across, pink, borne in close pyramidal spikes.

Culture &c. as for *S. Napæa.*

S. Napæa. — A smooth herbaceous perennial 4-10 ft. high, native of North America. Leaves 5-cleft, with oblong, pointed tooth lobes. Flowers in summer, large, white, in umbellate corymbs.

Culture and Propagation. — This species may be used in masses in the border, but the plants should not be too crowded. Seeds are freely produced every year and may be sown as soon as ripe either in cold frames or in gentle heat in spring. The seedlings in both cases are pricked out and grown on to be transferred to the open ground in mild weather in April and May. The plants may also be divided in early autumn or spring, but the same general treatment as recommended for *Sidalcea candida* will also suit this plant perfectly, see p. 276.

ABUTILON.—A genus containing about 70 species of soft, downy herbs or shrubs, rarely trees, with leaves often heart-shaped, angled or lobed, rarely narrow. Flowers usually axillary. Bracteoles none. Calyx 5-cleft. Stamen-tube divided at the apex into numerous filaments.

Culture and Propagation.—There are no Abutilons hardy enough to stand a frosty winter in the British Islands, except perhaps in the very mildest parts. In the winter of 1879-80 plants were uninjured out of doors at Bournemouth, but at Ryde in the Isle of Wight they were not unnaturally injured by 15° of frost. In most parts of the country nearly all kinds may be placed out of doors from the end of May till September, in rich turfy loam, peat, and leaf soil, with plenty of sand. In the very mild parts the following kinds may be tried permanently, with protection in the event of severe winters. They root readily from cuttings of the young wood in spring in a temperature of 65°-70°. When well rooted the plants are placed singly into small pots in rich soil, and kept shaded and moist for a few days until they become established. They are afterwards moved to a cooler place, and gradually hardened off with plenty of air and sunshine, and will be ready for the outdoor garden by the beginning of June. Cuttings of the ripened shoots will also root readily in heat about August and September, and plants raised at this period will make fine specimens for planting out the following June if grown on in heat during the winter and early spring months, afterwards hardening them off as advised above. Seeds of Abutilons may be sown as soon as ripe or in spring in a temperature of 65°–70° Fahr.

A. Darwini.—A Brazilian species about 4 ft. high, with large, broad leaves, and finely cupped, bright orange flowers, with darker veins. There are many hybrids raised from this.

Culture &c. as above.

A. megapotamicum (*A. vexillarium*). A well-known species from the Rio Grande river with ovate acute toothed leaves and masses of drooping bell-shaped flowers, having deep red sepals, and pale yellow-brown petals with deeper coloured netted veins.

Culture &c. as above. This species is usually grown up pillars or on the roofs or sides of greenhouses, in which it is very ornamental during the autumn and winter months. In the south and west it is practically hardy in ordinary winters, as is also *A. vitifolium* below, and both are valuable for covering south walls.

A. striatum.—A free-growing Brazilian species, with large lobed leaves and orange-yellow flowers, veined with blood-red.

Culture &c. as above.

A. vitifolium.—A fine Chilian climbing shrub, suitable for walls. Leaves heart-shaped, 5–7-lobed, assuming a fine golden tint in autumn. Flowers in early summer, large, cupped, porcelain-blue. *A. Sellowianum marmoratum*, with beautifully marbled leaves, is a lovely plant.

Culture &c. as above.

HIBISCUS.—This genus contains 150 species of trees, shrubs or herbs, with leaves often lobed or variously cut. Bracteoles persistent or caducous, numerous, rarely 3–5, often narrow, free or united. Calyx 5-cleft or toothed. Stamen-tube truncate or 5-toothed below the apex, rarely anther-bearing, with numerous protruding filaments.

Culture and Propagation.—The following are the only species which grow well out of doors in this country. They like a rich loamy soil and warm sunny positions to bring their flowers to perfection as early in the summer as possible, otherwise they will not bloom until autumn and may be spoiled by early frosts. The perennial kinds may be increased by seeds, or cuttings rooted under glass; the annual kinds from seeds sown in gentle heat about February or March, or in the open border in April and May.

H. Manihot.—A handsome shrub 6–9 ft. high, native of the Old World Tropics, with pedately lobed leaves 6 in. across, and beautiful soft yellow flowers 4–6 in. across, with a deep purple blotch at the base of each petal.

Culture and Propagation.—This plant is best treated as an annual, and may be raised from seeds sown in heat in February and planted out at the end of May. Seeds may also be sown as soon as ripe in cold frames or in gentle heat, and the seedlings may be grown on during the winter months under glass, until favourable weather in May, when they may be planted out.

H. militaris.—A fine perennial 3–4 ft. high, native of the United States. Leaves heart-shaped, toothed, more or less 3-lobed, downy beneath. Flowers rosy, about 4 inches across, bell-shaped, produced in late summer and autumn.

Culture &c. as above. This species should be grown in damp places.

H. Moscheutos.—A vigorous N. American perennial 3–5 ft. high, with large, ovate, pointed, serrate leaves, downy beneath. Flowers white, with a purplish centre, sometimes pale rose or purple.

Culture &c. as above.

H. palustris.—A native of the swamps and marshes of N. America, 3–5 ft. high. Leaves broadly ovate, bluntly serrate, downy and whitish beneath. Flowers large, bell-shaped, 3–4 in. across, white tinted with rose, and having a ring of deep purple at the base.

Culture &c. as above. This species requires to be grown in damp situations, where, however, it will have plenty of sunshine.

H. roseus.—An attractive species, 4–6 ft. high, naturalised in marshy spots in France, but native of N. America. Leaves large, broadly ovate, pointed, white beneath. Flowers large, rosy, solitary, about 4 in.

across, and spotted or blotched with purple at the base. *H. militaris* and *H. palustris* are considered to be botanical varieties of this.

Culture &c. as above for *H. palustris*.

H. syriacus (*Althæa frutex*).—A deciduous Syrian shrub 6–8 ft. high, with ovate wedge-shaped, 3-lobed, toothed leaves. Flowers in the type purple with a crimson spot at the base of each petal.

There are many varieties with colours varying from pure white, such as *totus albus*, to deep blue, like *cælestis*. There are also several very fine double-flowered varieties in various colours.

Culture &c. as above. This makes a beautiful flowering bush, and in the south and west looks very handsome out of doors.

H. Trionum (*H. africanus*).—*Bladder Ketmia.*—A beautiful hairy, branched annual, about 2 ft. high, native of Africa, S. Europe &c. Leaves heart-shaped, palmately lobed; lobes linear. Flowers yellow, 2–3 inches across, with a purple centre, produced from July to September and October.

Culture &c. as above, p. 279. Seeds of this handsome species may be sown in gentle heat in March, or in the open border in April and May in the warmer parts of the country. The plants prefer a light rich soil and sunny situations, with plenty of water in summer.

Closely related to this species is *H. vesicarius* (or *H. grandiflorus*) which has more deeply lobed and toothed leaves, and larger flowers.

XXV. STERCULIACEÆ

A natural order consisting of herbs, shrubs, or trees, with alternate or rarely nearly opposite, entire, toothed, or lobed leaves. Flowers regular, hermaphrodite or one-sexed. Calyx gamosepalous, more or less deeply 5-lobed. Petals 5, hypogynous, free, or adnate to the base of the staminal tube. Stamens often united at the base into a cylindrical or urn-shaped tube. Ovary free, 2–5-celled. Fruit a dry capsule, or rarely a berry.

This order contains over 40 genera and more than 500 species, mostly natives of tropical regions. The following genus is the only one representing the order in the open air in the British Islands.

FREMONTIA.—A genus represented by only one species :—

F. californica.—A beautiful deciduous Californian shrub, with brown stems 6–10 ft. high, and heart-shaped 5–7-lobed leaves, hairy beneath; the young shoots covered with a rich reddish-brown tomentum, and minute warts. Flowers in June, bright yellow, about 2 in. across, solitary on short stalks opposite the leaves. Calyx spreading, bell-shaped, deeply 5-lobed, with a depression at the base of each segment. Petals none. Stamen-tube 5-cleft, with orange-red anthers.

Culture and Propagation. — This species thrives in a sandy loam, and should have a position facing west or south-west, but not too hot or dry. It may be increased by cuttings in spring, under a bell glass in gentle heat. When well rooted the plants may be potted up singly and grown on until they have become large enough for planting in the outdoor garden.

XXVI. TILIACEÆ—Lime Tree or Linden Tree Order

An order containing about 40 genera and over 300 species of trees and shrubs, rarely herbs. Leaves alternate, or in a few species opposite or nearly so, simple, penninerved or palminerved, entire, toothed, or rarely lobed. Stipules twin, usually small and deciduous, rarely large and persistent, or absent altogether. Flowers regular, hermaphrodite, or rarely 1-sexed, axillary or terminal, often cymulose. Sepals 5, rarely 3 or 4, free or connate. Petals as many in number, or fewer, or absent, usually with a small pit at the base, alternate with the sepals, inserted round the base of the torus, entire or incised; twisted in bud or variously imbricated. Stamens usually many, hypogynous, free, or rarely cohering in a ring, or in 5–10 bundles. Ovary free, sessile.

TILIA (LIME TREE; LINDEN).—A genus of 8 species of tall ornamental trees with simple or stellate hairs. Leaves stalked, often obliquely cordate, serrate. Flowers white or yellowish in axillary or terminal cymes on the young growths, with a leafy bract half-winged, half-free, attached to the stalk. Sepals and petals 5, the former boat-shaped, the latter often with a scale at the base. Stamens many, free, or irregularly disposed in bundles. Fruit globose, nut-like, indehiscent, 1–2-seeded.

Culture and Propagation.—The Lime trees are stately ornaments of our landscape, either as solitary specimens on large lawns, or in avenues in parks. They like good loamy soil and do well everywhere except on exposed and hilly situations. They are usually increased by layers, which are fit for transplanting in about 12 months. Young trees that have been transplanted several times are best for starting in gardens. The choicer varieties are usually grafted on stocks of the common Lime. Seeds are very rarely ripened in this country, and even if they were it is not worth while going through the very slow process of raising plants from them. A good selection may always be obtained from nurserymen.

It may be mentioned that Russian Bast and the bast mats so much used for covering frames in winter are the product of the inner bark of various species of Lime tree.

T. **americana** (*American Basswood or Whitewood*).—A North American tree 60–70 ft. high, with deeply heart-shaped, abruptly pointed, smooth, leathery, serrate leaves. Flowers in summer, yellowish-white, followed by yellow fruits as large as peas. *T. pubescens* is a variety with yellow flowers, and leaves 3–4 in. across, with short and broad serratures. There are several other forms or variations, in some of which the leaves are very large.

Culture &c. as above.

T. **argentea** (*T. alba*). — *White* or *Silver Lime.*—A native of E. Europe, 30–50 ft. high, with heart-shaped, somewhat pointed serrated leaves, unequal at the base, smooth above, downy beneath. Flowers in summer, yellowish-white, fragrant; petals with a scale at the base. Fruit yellow, ribbed.

Culture &c. as above.

T. **cordata** (*T. microphylla; T. parvifolia; T. ulmifolia*). — A small native tree, with ovate heart-shaped, smooth, pointed leaves, finely toothed, glaucous, and bearded in the axils of the nerves beneath. Flowers in summer, yellowish-white, petals without a scale at the base. Fruit globose or ellipsoid, hoary or downy, faintly ribbed.

Culture &c. as above.

T. **dasystyla.**—A tree 30–60 ft. high, native of the Crimea. Leaves obliquely truncate at the base, or somewhat heart-shaped, slightly hairy beneath and bearded in the axils of the nerves. Flowers in summer, yellowish-white; style downy at the base.

Culture &c. as above.

T. **heterophylla** (*American White Basswood*). — A North American tree 30–50 ft. high, with leaves 4–8 in. across, very oblique, more or less heart-shaped, abruptly pointed, shining green above, white and downy and conspicuously nerved beneath. Flowers in summer, greenish-yellow, with blunt, crenulated petals.

Culture &c. as above.

T. **petiolaris** (*T. alba pendula; T. americana pendula; T. argentea pendula*).—A Crimean species 50 ft. or more high, with drooping branchlets. Leaves pale green above, white with a hoary down beneath. Flowers in July, yellowish-green, with 5 petal-like scales among the stamens. Fruit globose, 5-lobed, warted.

Culture &c. as above.

T. **platyphyllos** (*T. grandifolia*). — This is our native large-leaved Lime tree, 70–90 ft. high, differing very little from *T. cordata* in foliage and flowers. Leaves sometimes downy on both surfaces, but always underneath. Flowers in June, yellowish-white; petals without scales. Fruit obovate, globose, 3–5-ribbed when ripe. The variety *laciniata* has curiously cut leaves, and is dwarfer and less vigorous than the type; *aurantia* has orange-yellow twigs; *blechiana* is a distinct and strong-growing variety with very large leaves; *pyramidalis* is pyramidal in growth; *vitifolia* has lobed, vine-like leaves.

Culture &c. as above.

T. vulgaris (*T. europæa; T. intermedia*).—*Lime*, *Lin*, *Linden*, or *Lime tree*.—A S.E. European plant naturalised in this country. Leaves smooth above, obliquely heart-shaped, bearded in the axils of the nerves beneath. Flowers in June and July, pale yellow; petals without a scale at the base. The variety *variegata* is recognised by its leaves having creamy-white blotches.

ARISTOTELIA.—A small genus having a few species of evergreen shrubs, with usually almost opposite, entire, or toothed leaves. Flowers axillary or lateral, racemose, often polygamous. Sepals 4-5, valvate. Petals 4-5, 3-lobed, toothed or almost entire, thickened round the base of the torus. Stamens many. Fruit a berry, small, indehiscent.

A. Macqui. — A handsome Chilian shrub, about 6 ft. high, with oblong acute, smooth, shiny, toothed leaves, and small greenish axillary flowers borne in May. The pea-like berries are very deep purple, becoming black when fully ripe. The variety *variegata* is more ornamental than the type, but not quite so hardy.

Culture and Propagation.—This is a good plant for the shrubbery, and will grow well in ordinary soil. Cuttings of the ripened or partially ripened shoots under a hand-glass root freely in sandy soil during the summer and autumn months. They may be grown in frames until spring, and then planted out. Fresh plants are also obtained by layering the branches in late summer and autumn.

A. racemosa. — An ornamental deciduous shrub or small tree, native of New Zealand, where it grows 6–20 ft. high. It has rather large irregularly shaped leaves of a bright and pleasing green, and produces its greenish flowers in racemes in May.

Culture &c. as above. This species does not seem to be quite hardy except in the milder parts of the kingdom. It flourishes on a south wall and is chiefly valuable for the ornamental appearance of the foliage. It may be raised from imported seeds or by cuttings in the same way as *A. Macqui.*

XXVII. LINEÆ—Flax Order

A small order of smooth or rarely hairy or tomentose herbs, shrubs, or rarely trees. Leaves alternate, or very rarely opposite, simple, entire, or slightly serrate-crenate. Flowers regular, hermaphrodite, usually terminal, in racemes, panicles, corymbs, heads, clusters, or spikes. Sepals 5, rarely 4, free, or united below. Petals 5, rarely 4, hypogynous, or rarely slightly perigynous, often twisted; usually blue, yellow or white, rarely rose, very fugacious, or persistent in a few genera. Stamens equal in number to the petals, with a similar number of staminodes, often twice—rarely thrice— as many.

LINUM.—A genus containing about 80 species of smooth or rarely downy herbaceous plants, sometimes shrubs, with alternate, or very rarely opposite, narrow, entire, one- to many-nerved leaves. Stipules absent or glandular. Flowers in terminal or axillary racemes, panicles, or clustered cymes, yellow, blue, or rarely rosy, crimson, or white. Sepals 5, entire. Petals 5, twisted, very fugitive. Stamens united below, hypogynous, alternate with the petals; staminodes equal in number, minute or bristle-like. Glands 5, small, adnate to the stamen-tube, opposite the petals. Styles 5, usually free.

Culture and Propagation.—All the Linums are free-flowering and ornamental. The annual species are easily raised from seeds, and so are the perennials, which may also be divided or increased by cuttings. The latter should be taken in summer and inserted in a shady place under glass.

The plants will grow in ordinary garden soil, but where a feature is made of them they may be grown in well-drained sandy loam, to which may be added a little peat or leaf mould. In bleak or northerly parts of the British Islands, the plants should have warm, sheltered positions. Unless otherwise stated, the species described below are all perennials.

To secure the finest and most brilliant effects Linums should be grown in large patches, and the colour of their flowers should always be taken into consideration when massing them with plants of other colours, so that a harmonious result is obtained.

L. alpinum.—Native of Europe, 6 in. high, with linear, awl-shaped leaves, full of pellucid dots. Flowers in summer, large, blue, 8-9 on each stem.

Culture &c. as below for *L. flavum.* This is well suited for the rockery or for massing in the front of the flower border.

L. angustifolium (*Pale Flax*). — A smooth, glaucous, native species about 1-2 ft. high, with sharp linear-lance-shaped leaves. Flowers from May to September, less than 1 in. across, pale lilac-blue.

Culture &c. as below for *L. flavum.*

L. arboreum. — A beautiful dwarf shrub about 1-1½ ft. high, native of Crete, with bluntly wedge-shaped, recurved leaves. Flowers in early summer, yellow, 1½ in. across.

Culture and Propagation.—This is an evergreen species, and when grown in sheltered spots retains its freshness during the winter months. Grown as a pot plant in a cool or slightly heated greenhouse, it may be had in bloom in February and March. Seeds are rarely ripened, but plants are readily obtained by means of cuttings of the more or less ripened shoots during July and August. They may be inserted in sandy soil in a cold frame, and kept shaded and damp until rooted. Afterwards the plants should be given as much light and air as possible, except in very frosty weather, and by April and May they will be fit for transplanting to the flower border, or against a wall, according to locality. They require slight protection during severe winters in northern parts of the kingdom, although hardy in ordinary winters in the neighbourhood of London.

L. austriacum.—A smooth Austrian species 1-2 ft. high, with linear lance-shaped acute leaves, covered with pellucid dots. Flowers in summer, pale bluish-purple. Closely related to *L. perenne.*

Culture &c. as below for *L. flavum.*

L. campanulatum.—A glaucous plant, about 1 ft. high, native of S. Europe. Lower leaves rounded at the apex, the others more or less broadly lance-shaped. Flowers from June to August, bright yellow, borne in corymb-like cymes.

Culture and Propagation.—This species is closely related to *L. flavum*, and it is possible that hybrids between the two exist. It is as a rule too tender to stand our winters except in the mildest parts of the south and west, and like *L. arboreum* it rarely produces good seed in our climate. New plants, however, may be obtained from cuttings taken in July and August and inserted in a cold frame in the way described under *L. arboreum.*

L. flavum.—A handsome species 12-18 in. high, native of Austria and Hungary, with sharp narrow lance-shaped leaves, without stalks. Flowers in summer, golden-yellow, freely produced, but in more compact heads than those of *L. campanulatum.*

Culture and Propagation.—This species resembles *L. arboreum* in appearance and blossom, and also *L. campanulatum*, but its stems die down in winter. It is, however, much hardier than these other two species, and throws up vigorous shoots in spring. Seeds are also freely produced in favourable seasons, and new plants may be obtained by sowing them in the open border as soon as ripe, in a warm sheltered position. They do not, however, germinate till spring, and then the seedlings may be either pricked out into good rich soil or thinned out 12-18 in. apart. Warm sunny positions are best, and shade should be avoided, so as to get a greater abundance of blossom.

L. grandiflorum.—A beautiful smooth Algerian annual 6-12 in. high, with linear lance-shaped acute leaves, and large rose-coloured flowers 1½ in. across in summer.

Culture and Propagation.—By sowing seeds at intervals plants may be had in bloom from May to October. Plants for flowering from October onwards in the greenhouse may be obtained by sowing seeds in pots in summer and giving plenty of water. There are several forms in cultivation, the best known being *coccineum*, *roseum*, *rubrum*, and *splendens.*

L. Macræi (*L. Chamissonis*).—This Chilian species is somewhat tender, but will grow well outside from May to October. It is about 1 ft. high, with stiffish lance-shaped pointed leaves, and orange flowers.

Culture &c. as for *L. monogynum.*

L. monogynum.—A shrubby-stemmed New Zealand plant 1 ft. high, with lance-shaped leaves. Flowers in summer, white, about 1½ in. across. The variety *candidissimum* is a superior plant to the type, having larger and finer flowers and a more compact habit.

Culture and Propagation. — This species is easily increased from seeds sown as soon as ripe in cold frames. The seedlings may be transplanted in mild weather in spring in the same way as those of *L. flavum.* Cuttings of the more or less ripened shoots may also be rooted in cold frames as recommended for *L. arboreum.*

L. narbonense.—A somewhat glaucous smooth plant, 2 ft. high, native of S. Europe. Leaves lance-shaped linear, very acute, rather stiff. Flowers from May to July, sky-blue with violet veins, sometimes white, in loose corymbs.

Culture and Propagation.—This is one of the finest of the blue-flowered Linums and will flourish in almost any soil. It is quite happy even on dry, poor soil, and not only flowers with great freedom but produces seed freely. These may be sown as soon as ripe in the same way as recommended for those of *L. flavum* above.

L. nervosum.—A native of E. Europe, 12–18 in. high, with smooth lance-shaped pointed leaves. Flowers in summer, blue, large, with slightly notched or pointed petals, crenate at the apex.

Culture &c. as above for *L. flavum.*

L. perenne.—A native evergreen species 12–18 in. high, with narrow linear-lance-shaped acute leaves. Flowers in summer, 1 in. across, usually bright blue, but pink or white in some varieties.

Culture &c. as for *L. flavum* and *L. narbonense.*

L. salsoloides.—A somewhat shrubby evergreen, 1 ft. high, native of S.W. Europe, with smooth, linear leaves. Flowers in summer, ½ in. across, white with a purple centre.

Culture &c. as above for *L. monogynum.*

L. sibiricum. — A smooth Siberian species 3–4 ft. high, with large beautiful blue flowers. Closely related to *L. perenne.*

Culture &c. as for *L. flavum.*

L. tauricum.—An evergreen shrubby species about 1½ ft. high, native of the Caucasus. Leaves glaucous, spoon-shaped or lance-shaped. Flowers from June to August, yellow.

Culture &c. as above for *L. arboreum.*

L. usitatissimum (*Common Flax*).—A beautiful smooth European annual about 1½ ft. high, with lance-shaped or linear-acute-leaves, and blue flowers in summer.

Culture &c. as above for *L. grandiflorum.* This is the species so largely grown in Ireland and elsewhere for the production of flax, but it is also useful as a border plant.

L. viscosum.—A Pyrenean plant 1–2 ft. high, with lance-shaped, slightly downy leaves, covered with viscid glands. Flowers in summer, about 1 in. across, pale purple or lilac, with deeper veins. They often last well into November and December.

Culture and Propagation.—This is a good plant for the rock garden, where it can be established. It likes warm sunny positions and the same treatment generally as *L. arboreum.* It may be increased from cuttings taken in July and August, and inserted in sandy soil in cold frames in the same way as recommended for *L. arboreum.*

Series II. DISCIFLORÆ (see p. 123)

XXVIII. GERANIACEÆ—Geranium and Pelargonium Order

An order containing about 750 species of herbs (sometimes climbing) or undershrubs, rarely trees, smooth or often clothed with a glandular down. Leaves opposite or alternate, often 2-stipuled, toothed, lobed, dissected, very rarely entire. Peduncles often axillary, one-flowered or somewhat umbellately many-flowered, rarely cymose or racemose. Flowers hermaphrodite, regular or irregular. Sepals 5, rarely fewer, free or sometimes united to the middle, imbricate, rarely valvate, the upper one spurred in some genera; persistent or rarely deciduous. Petals 5, or by abortion fewer or absent, hypogynous or somewhat perigynous, variously imbricated, rarely twisted. Torus with 5 glands alternate with the petals, or glandless. Stamens usually ten, rarely more or fewer. Fruit either a 3–5-lobed capsule, or separating into cocci, rarely a berry.

GERANIUM (Crane's Bill).—A genus with about 100 species of herbs, rarely shrubs, with opposite or alternate, toothed, or usually palmately lobed leaves, usually stipulate. Peduncles axillary, 1-2-flowered. Flowers regular, sepals and petals 5, hypogynous; glands 5, alternate with the petals. Stamens usually 10, of which 5 are sometimes imperfect. Carpels 5, separating below and curling upwards when ripe around a central column resembling a bird's bill—hence the popular name.

Culture and Propagation.—Geraniums grow readily in ordinary well-drained garden soil, and are well adapted for the rock garden, margins of borders, banks &c. They may be increased from seeds sown in spring or autumn, in warm sheltered parts of the open border, or better still in shallow pans or boxes in cold frames. When the seedlings are well developed they may be pricked out 2–3 inches apart and grown on until they again almost touch. During mild weather in spring they may be planted in the flower garden 1½–2 ft. or more apart according to vigour. A very simple and easy method of increasing most Geraniums is by division of the rootstock. This work is performed about the end of September, or not later than October, or in mild weather in spring as growth is commencing.

In order to see Geraniums at their best, the plants when once established should not be disturbed for 3 or 4 years. A good mulching of well-rotted manure may be placed around the crowns of the plants in early winter, to act not only as a shelter to the roots during severe frosts, but also to replenish the soil with nutritious food for them in spring. At the latter period the manure may be very lightly forked into the soil just beneath the surface, if desired.

Note.—The plants popularly called 'Geraniums' in gardens are in reality Pelargoniums (see p. 288).

G. albanum (*G. cristatum*).—A native of S.E. Europe, 1 ft. high, with kidney-shaped, 7-lobed and toothed leaves. Flowers in May, purple, on hairy stalks.
Culture &c. as above.

G. argenteum.—A beautiful alpine 2–3 in. high, native of N. Italy. Leaves long-stalked, hoary or silky on both sides, 5–7-parted and cut. Flowers in summer, large, pale rose with darker veins.
Culture &c. as above.

G. armenum.—A vigorous and very handsome Armenian species, about 2 ft. high, with rather smooth stems and leaves, the latter being 5-lobed and more or less toothed at the base. The loose leafy cymes of flowers appear in June and July, and are very effective owing to the brilliant purple colour of the petals, each of which has a deeper purple blotch at the base, from which veins radiate over the surface.

Culture and Propagation.—This species is practically hardy in ordinary winters, and may be increased from seeds—which are freely produced—or by division as stated above.

G. asphodeloides (*G. subcaulescens*). Native of S. Europe, about 6 in. high, with very downy 5-lobed and cut leaves. Flowers in summer, usually purplish-violet.
Culture &c. as above.

G. atlanticum.—An Algerian species 12–18 in. high. Leaves roundish, cut nearly to the base into 5–7-lobed, cut and toothed segments. Flowers in June, 1½ in. across, pale purple with red veins. This species is also known as *G. malvæflorum*.
Culture &c. as above.

G. caffrum.—A S. African species 9 in. or more high. Leaves 1-3 in. across, hairy above, 3-5-lobed, with several acute, irregular teeth. Flowers in June, pale lilac or white, with obovate petals.

Culture &c. as above.

G. cinereum.—An almost stemless Pyrenean plant about 6 in. high. Leaves covered with glaucous down, 5-7-parted and cut. Flowers in summer, pale red with dark stripes.

Culture &c. as above. Owing to its dwarf habit and compact growth this species may be used for making borders to flower beds, and is also well adapted for the lower parts of the rockery. It likes a light well-drained soil.

G. collinum. — Native of E. Europe, with angular, somewhat decumbent, downy stems. Leaves palmately 5-parted, lobed and deeply serrated. Flowers in early summer, purplish-violet; petals entire, roundish; flower stalks and calyx covered with clammy hairs.

Culture &c. as above.

G. dahuricum.—A native of Dahuria 1 ft. high, with opposite, 3-5-parted, acutely lobed leaves. Flowers in June, purple; petals entire. much bearded at the base.

Culture &c. as above.

G. Endressi.—A Pyrenean plant 1 ft. high. Leaves opposite, 3-5-lobed, acute, serrate. Flowers in summer, pale rose, with darker veins; petals oblong ovate, entire, fringed at the base.

Culture &c. as above.

G. eriostemon.—A Nepalese species 6-36 in. high. Leaves 5-lobed, deeply toothed, lower ones long-stalked, alternate, upper ones sessile, opposite. Flowers in June, pale violet; stamens white, purple at the top; petals bearded at the base.

Culture &c. as above.

G. ibericum. — A showy Caucasian species about 1 ft. high. Leaves hairy, 5-7-parted, pinnately lobed, toothed. Flowers in summer and autumn, large, blue; petals obcordate or somewhat 3-cleft. The variety *platypetalum* is a taller hairy plant with a profusion of deep violet flowers streaked with red.

Culture &c. as above.

G. Lamberti. — A native of Nepaul about 18 in. high. Leaves heart-shaped, softly hairy on both sides, 5-lobed, cut and toothed. Flowers in summer, large, bright lilac.

Culture &c. as above.

G. lucidum. — A native annual or biennial 6-12 in. high, with roundish, shining, 5-lobed leaves. Flowers from May to August, bright rose, about ½ in. across.

Culture &c. as above. Increased by sowing seeds annually, either out of doors in warm parts of the kingdom, or in cold frames in less favoured spots.

G. macrorhizon.—A native of South Europe, 1 ft. high, with smooth, 5-parted deeply toothed and lobed leaves, often spotted with brownish-red. Flowers from May to July, deep red or bright purple; calyx globose, swollen.

Culture &c. as above.

G. maculatum.—A N. American species 1½ ft. high, with 3-5-parted, deeply toothed and lobed leaves, lower ones long-stalked, upper sessile. Flowers in summer, pale lilac.

Culture &c. as above.

G. phæum.—A native of Central and W. Europe, naturalised in Britain, about 1½ ft. high. Leaves 5-9-lobed, deeply toothed. Flowers in early summer, dark brown, almost black, with a white spot at the base of each entire petal. The variety *lividum* has dull purplish flowers; and the variety *roseum* has rose-coloured blossoms.

Culture &c. as above. This species seems to prefer partially shaded spots in the rockery or flower border.

G. pratense. — A beautiful British plant 2-3 ft. high, with round, downy stems. Leaves 7-parted, cut into linear, deeply serrated lobes. Flowers in summer, large, blue flushed with violet, and borne in corymb-like panicles. There is a fine double blue and a double white-flowered variety.

Culture &c. as above.

G. robertianum (*Herb Robert*). — A common but pretty British species 6-9 in. high, with 3-5-parted lobed leaves. Flowers in summer, bright crimson, ½ in. across. The variety *album* has white flowers.

Culture &c. as above.

G. sanguineum.—A fine native species 1-2 ft. high, with hairy 5-7-parted leaves, the lobes again divided into 3-5 narrow segments. Flowers in summer, crimson or blood-red, about 1½ in. across. The variety *lancastriense* has large flesh-coloured flowers with purple veins. It grows only 4-6 in. high. There is also a white-flowered form of *G. sanguineum.*

Culture &c. as above. This species flourishes in light sandy soils, and is excellent for massing in the flower beds, borders, rockeries, banks &c.

G. striatum.—A native of S. Europe with 3 5-lobed cut and toothed leaves. Flowers from May to October, pink, with darker veins; petals notched.

Culture &c. as above.

G. sylvaticum.—A British plant 2-3 in. high, with 5-7-lobed, deeply toothed leaves. Flowers in summer, less than 1 in. across, purple or blue, with crimson veins; white in the variety *album.*

Culture &c. as above. A good plant for edgings and borderings, and also for the rock garden in light well-drained but moist soil.

G. tuberosum.—A native of S. Europe, 9 in. or more high, having a roundish tuberous rootstock and knotted forked stems. Leaves many-parted, with linear pinnatifid serrated lobes. Flowers in early summer, purple, large, numerous, with deeper coloured veins, petals 2-cleft. There is a variety called *Charlesi* from Afghanistan which may be recognised by having a series of roundish superimposed tubers, and by the leaf segments being less lobed than in the type.

Culture &c. as above. In cold northern parts of the kingdom it may be advisable to cover the tuberous rootstocks with bracken or a heap of dry leaves in severe winters. In such localities the roots should be planted rather deeply, as a further protection, but the soil must be thoroughly well drained.

ERODIUM (HERON'S BILL; STORK'S BILL).—A genus of about 50 species of pretty herbs, very rarely shrubs, often with jointed knotty branches. Leaves opposite or alternate, toothed, lobed, or often pinnately dissected. Peduncles axillary, with flowers usually in umbels. Flowers regular or scarcely irregular. Sepals 5, imbricate. Petals 5, hypogynous, imbricate, 2 upper ones sometimes deficient. Stamens 5, alternating with the 5 scale-like staminodes. Disk of 5 glands, alternate with the petals. Ovary 5-lobed. Tails of carpels spirally twisted and curling upwards.

Culture and Propagation.—Erodiums, which omit a strong peculiar smell when bruised, thrive in a sandy well-drained soil in sunny places, and are excellent plants for the rock garden or border. They are easily increased by division of the rootstock, either in early autumn or in spring, or from seed sown in cold frames either as soon as ripe or in spring. Indeed, there is practically no difference in the treatment of *Erodiums* and *Geraniums*, which resemble each other a good deal in appearance and blossom. The cultural remarks under Geranium may be applied to each of the following species.

E. alpinum.—A native of the S. Italian mountains, with rather smooth, twice pinnately cut leaves. Flowers from spring to autumn, purple, about 1 in. across, 6-10 in an umbel.

Culture &c. as above.

E. carnifolium. — A native of the Spanish mountains 6-10 in. high. Leaves alternately pinnate, 8-9 in. long, leaflets deeply cut, twice divided, the midrib covered with soft, downy hairs beneath. Flowers in spring and early summer, red, about ½ in. across, 8-10 in an umbel.

Culture &c. as above.

E. hymenodes (*E. trilobatum*). — A native of the Atlas Mountains 6-15 in. high, with somewhat 3-lobed, very blunt, deeply toothed leaves. Flowers in spring and summer, pink, the upper petals with a red-brown blotch at the base.

Culture &c. as above.

E. macradenum (*E. glandulosum*).—A stemless Pyrenean plant about 6 in. high. Leaves twice divided, forming tufts, clothed with a glandular down, and possessing a peculiar aromatic fragrance. Flowers in summer, pale violet, or flesh colour, with purple-rose veins, the two upper petals having a dark spot at the base.

Culture &c. as above.

E. Manescavi. — A native of the Pyrenees 1-2 ft. high. Leaves pinnate, with oblong, deeply cut leaflets. Flowers in summer, purplish-red, from 5-15 in an umbel-like truss.

Culture &c. as above.

E. pelargoniflorum.—A native of Anatolia with ovate cordate leaves springing from the roots. Flowers in summer, white spotted with purple, 8–10 in an umbel.
Culture &c. as above.

E. petræum. — A stemless Pyrenean plant 3–6 in. high. Leaves rather smooth, pinnate, with deeply divided segments, and lance-shaped linear lobes. Flowers in early summer, bright rose, or white and veined, but not spotted.
Culture &c. as above.

E. Reichardi.—A native of Majorca, only 2–3 in. high, with small heart-shaped, crenate, blunt, smoothish leaves. Flowers from April to September, solitary, white faintly veined with pink.
Culture &c. as above.

E. romanum.—A S. European biennial 6 9 in. high, with pinnate leaves having ovate deeply cut leaflets. Flowers from April to September, purplish, several on a stalk.
Culture &c. as above.

E. trichomanefolium. — A stemless plant 4–6 in. high, native of Mount Lebanon. Leaves bipinnate, hairy, rather glandular, with oblong linear lobes. Flowers in summer, flesh-coloured, with darker veins, about 4 on a stalk.
Culture &c. as above.

PELARGONIUM (Stork's Bill).—A genus of smooth or downy perennial herbs or undershrubs, with opposite, rarely alternate leaves, entire, toothed, lobed or variously cut, stipulate. Peduncles axillary, opposite the leaves, 2 or more on an umbel, rarely 1-flowered. Flowers irregular. Sepals 5, imbricate, united at the base, the upper one produced into a spur adnate to the pedicel. Petals 5, or fewer by abortion, slightly perigynous, dissimilar. Stamens 10, hypogynous, united at the base, usually 7 with fertile anthers. Ovary 5-lobed, beaked.

There are about 170 wild species of Pelargonium, natives chiefly of S. Africa, and requiring greenhouse treatment. The genus is important because from it are derived the various sections of Bedding Pelargoniums (popularly called Geraniums used in hundreds of thousands annually for beds and borders. The species described below (with the exception of *P. endlicherianum* and *P. quercifolium*) are mentioned chiefly on account of their connection with the Bedding 'Geraniums.'

P. endlicherianum.—A native of the Taurus Mountains in Asia Minor, 1½–2 ft. high. Lower leaves roundish, notched and toothed, the upper ones more or less deeply divided into 3–5 lobes. Flowers in late summer, deep rose, large, the 2 larger petals marked with 5 deep purple nerves.
Culture and Propagation. — This species is hardy in mild parts of the country, and thrives in sandy well-drained loam in a warm nook of the rockery. It may be increased by means of seeds or cuttings in the same way as *P. zonale* below.

P. inquinans.—A native of S. Africa about 2 ft. high, with roundish, kidney-shaped, downy leaves, crenate on the margins and almost undivided or very slightly lobed. Flowers in summer, varying from intense scarlet to rose and white, many on a stalk; petals broadly obovate.

This is the parent of the well-known Scarlet 'Geranium.' It has no dark zone on the leaf as in *P. zonale*, and has broader and shorter petals than that species.
Culture &c. as for *P. zonale* below.

P. peltatum (*P. hederæfolium; P. lateripes; P. scutatum*). — A S. African species, with shrubby, straggling stems, and smooth or downy, Ivy-like, 5-angled or lobed leaves. Flowers in summer, white or red, varying in size, several on a stalk.

This is the origin of the well-known Ivy-leaf 'Geranium.' This section has now become very valuable owing to the numerous fine double and semi-double flowered varieties. They are chiefly used for window boxes, vases &c., but if planted in round raised beds by themselves, with their stems trailing over the surface of the soil, they look very ornamental. Indeed this is their natural method of growing, and not trained up sticks or trellises upon which they have to be carefully and regularly tied to keep them in order. Their culture and propagation are the same as for the Zonal Pelargonium described below.

P. quercifolium. — This is so well known as the 'Oak-leaf Geranium' that it deserves mention. It is a shrubby plant 3 ft. or more high, with leaves cut and lobed like small Oak-leaves, and strongly scented. Flowers in summer.

purple or pink, more or less veined, 3–5 or more on a stalk.

P. zonale (*Horseshoe* '*Geranium*').—A shrubby plant 2 ft. or more high, with roundish, smooth or downy leaves, usually with a dark horseshoe-like zone, crenate toothed on the edges and slightly lobed. Flowers in summer, varying from scarlet and crimson to red and pure white, many on a stalk.

The numerous varieties of Pelargoniums (Zonals, Silvers, Tricolors, Bronzes &c.) used in bedding out are derived from hybrids obtained by crossing *P. zonale* with *P. inquinans*. The processes of selecting and crossing have gone on for nearly 200 years, and the progeny obtained are in no way like their parents. In the Zonal Pelargonium proper, it has been the aim of the gardener to get rid of the dissimilarity in the petals, and to obtain flowers in which every petal shall be equal, the whole forming a perfectly circular outline without a break between the petals. How far he has succeeded may be seen at any exhibition; not only are the flowers perfectly symmetrical in outline, but the size of the individual blooms, or 'pips' as they are technically called, has been greatly increased, and they are often larger than an ordinary watch.

Culture.—The outdoor cultivation of the Pelargonium is extremely simple. About the end of May or beginning of June according to locality and state of the weather, plants may be put into beds or borders containing ordinary well-dug soil, if a rich, sandy loam so much the better. Sometimes the varieties are mixed or kept separate according to the taste of the planter, but in any case they should not be nearer than 6 to 9 inches, or even more, as they soon make bushy growth.

Propagation.—The plants are usually increased by cuttings, which may be taken at any time as long as they are not too sappy. From June to August, however, is the best time out of doors. The cuttings may be inserted 2–3 in. apart in a prepared spot with a fair amount of sunshine, and by September they will have made good growth and plenty of roots. They should then be potted up singly in small pots and kept in a greenhouse or cold dry frame during the winter or in any light airy place where they will not be touched by frost. If possible the temperature during the winter months should not fall below 45° or 50° Fahr., and only very little water is required. If too much moisture is in the soil or atmosphere, the leaves and young growths are attacked with a fungus which soon causes them to decay. The best remedy against this is to raise the temperature by artificial means, such as hot-water pipes, and keep the greenhouse or frame in which the plants are grown in a fairly dry condition.

Where Zonal Pelargoniums can be grown in greenhouses during the winter months to keep up a good supply of bloom it is necessary to keep the temperature up to about 65°–70° Fahr., and the atmosphere overhead should not be charged with moisture to any great extent. The plants are usually raised from cuttings taken in spring and rooted in gentle heat, either singly in small pots, or in shallow boxes or pans. When well rooted they are potted up and grown on as mentioned above. No blossoms, however, are allowed to develop. As they appear they are pinched out with the finger and thumb, and all the energy of the plant is devoted to strengthening its constitution for flowering during the winter months. From the beginning of June to the end of September the plants should be stood out in the open air in a warm sunny position, and if kept well watered, and the shoots and blossoms pinched out, they will make fine bushy specimens by the end of the season. In the case of cuttings and seedlings, when well rooted, the tip of the main shoot should be pinched out. This will induce the side buds to make branches, and thus give the plant a dwarfer and sturdier habit. If pinching is neglected. the plants become lanky and weak, and do not flower so freely.

Zonal Pelargoniums may also be easily raised from seeds sown in August or September as soon as ripe. They germinate freely, and if the seedlings can be kept safe from frost during the winter, they will be fine and sturdy for planting out in early summer. In this way many new forms are likely to be obtained, and if any are really an improvement on existing varieties they may be retained and increased by cuttings in the way described above.

The above remarks apply to all sections of Pelargoniums. It will, however, be found that some varieties, especially among the 'Tricolors,' are somewhat more difficult to propagate and grow into good plants than others.

There are some hundreds of varieties in cultivation, but the following are among the very best for outdoor gardening:—

Best Scarlets and Crimsons.—Vesuvius, West Brighton Gem, Henry Jacoby, John Gibbons, Rev. A. Atkinson, Ball of Fire, Corsair, King of the Bedders, Geo. Potter, Triomphe de Stella, Wonderful.

Silver-leaved varieties.—Flower of Spring, Day-break, Mrs. Parker.

Tricolors.—Mrs. Pollock, Master Harry Cox, Lady Cullam, Countess of Ashburnham, Peter Grieve, Sophia Dumaresque.

Green and Gold.—Crystal Palace Gem, Happy Thought, Golden Christine, Robert Fish.

Bronze.—Zulu, Marshall McMahon, Black Douglas, Golden Harry Hieover, Bronze Queen, Bronze Beauty.

Ivy-leafs.—Album grandiflorum, Duke of Edinburgh, l'Elegant, Dolly Varden, Souvenir de Charles Turner, Madame Crousse &c.

Pinks.—Master Christine, Mrs. Turner, Constance, E. F. Crocker.

Whites.—White Vesuvius, White Princess, White Perfection, Queen of the Whites.

TROPÆOLUM (GOLDEN NASTURTIUM; INDIAN CRESS; YELLOW LARKSPUR).—A genus of about 35 species of beautiful twining or spreading annuals or perennials, with alternate peltate or palmately angled, lobed or dissected leaves. Stipules none, or minute. Peduncles axillary, 1-flowered. Flowers irregular, orange-yellow, rarely purple or blue. Sepals 5, united at the base, the upper one produced into a free spur. Petals 5, dissimilar, or fewer by abortion, often fringed or bearded at the base. Stamens 8, free, unequal, all anther-bearing. Fruit 3-lobed, fleshy, indehiscent.

Tropæolums are extremely valuable for training over trellises, arbours, old tree stumps, sheds, old walls &c. in the summer and autumn months, during which period their masses of peculiar-looking flowers and brilliant colours give a very gay appearance to the garden.

This genus is familiar on account of the dwarf and climbing varieties of *T. majus* and *T. minus*, popularly called 'Nasturtiums' simply. The Nasturtium proper belongs to the same order as the Wallflower and Cabbage (*Cruciferæ*).

Culture and Propagation.—Tropæolums are annual and perennial, the latter having either fibrous or tuberous roots. The annual varieties thrive in ordinary garden soil and may be raised from seeds sown out of doors in April. The perennial kinds like a richer soil—turfy loam and peat, with plenty of moisture at the root when growing. They may be increased by dividing the roots or tubers, or by inserting cuttings of the young shoots in pots or pans under glass.

The following are the best for outdoor gardening:—

T. Lobbianum.—A vigorous climbing annual, native of Columbia, with roundish peltate leaves, obscurely lobed, glaucous beneath. Flowers in summer, orange; calyx long-spurred, hairy; petals obovate, the 2 upper ones entire, scarcely lobed, the 3 lower ones smaller, deeply toothed, fringed, long clawed.

There are several beautiful varieties of this species, among which mention may be made of *Brilliant; Crystal Palace Gem* (or *elegans*); *fulgens; Golden Queen*, with pure golden-yellow flowers without spots; *hederæfolium*, with Ivy-like leaves of a dark metallic hue and deep crimson-scarlet flowers; *Napoleon III.*, yellow spotted with brown; *Spitfire*, with scarlet flowers and deep purplish foliage.

Culture and Propagation.—Seeds may be sown out of doors in April and May in patches where the plants are required to bloom during the season. They may also be sown in pots or shallow pans in cold frames or greenhouses in gentle heat about March, afterwards transplanting the seedlings at the end of May or beginning of June. If the seeds are sown in pots it will be unnecessary to prick the seedlings out separately, but the whole—pot, soil, and all—may be planted where required, thus avoiding injury to the roots and subsequent 'flagging' of the leaves.

T. majus (*Great Indian Cress* or *Nasturtium*).—This well-known climbing annual is a native of Peru. Leaves almost round, peltate, sometimes slightly lobed or wavy. Flowers in summer and autumn, rich orange, large and showy, the 2 upper petals marked with deep red-brown. There are several varieties of this species, with crimson, scarlet, orange, and striped flowers. The *Tom Thumb* section is valuable for bedding or for the edges of borders &c. A few of the best dwarf kinds are *Empress of India*, bright crimson; *Golden King*, golden-yellow; King of Tom Thumbs, scarlet; *King Theodore*, deep crimson; *Pearl*, creamy-white; *Ruby King*, rosy-scarlet; *Vesuvius*, brilliant scarlet.

Among the double-flowered kinds *Grandiflorum plenissimum*, double yellow, with a deep maroon blotch at the base, and *Hermine Grashoff*, scarlet, are the best.

Culture &c. as above for *T. Lobbianum.*

T. minus.—This resembles *T. majus* but is smaller and weaker growing. The flowers are deep yellow, streaked with orange and red; the petals end in a bristly point. The plant is also a native of Peru. There is a variety called *coccineus*, which has a yellow calyx spotted with carmine, and deep scarlet-crimson petals with a scarlet beard.

Culture &c. as above for *T. Lobbianum.* This small growing species is valuable for making edgings to beds and borders, or for furnishing the base of tall naked-stemmed trees &c.

T. pentaphyllum (*Chymocarpus pentaphyllus*).—A vigorous tuber-rooted climber, native of Buenos Ayres, with slender purple stems, slightly twisted and branched. Leaves about 2 in. across, cut into 5 oblong entire, smooth leaflets. Flowers in summer. Calyx dull purple, 1¼ in. long, greenish, marked with deep purple within; petals bright vermilion, small, roundish, somewhat clawed.

Culture and Propagation. — This species likes warm sunny spots and good soil, and may be used for covering pillars, bowers &c. in the same way as *T. Lobbianum*, *T. majus* &c. The tuberous roots are best planted in April or May in light and well-drained sandy soil, with which a little well-rotted leaf mould or manure has been incorporated. Seeds may be sown under glass soon after ripening, and the young plants are best protected in greenhouses until about the end of May when the weather will be favourable enough as a rule for planting them out. During the winter months, especially if severe frosts prevail, the tubers should be protected with a covering of dry leaves, ashes, or sand, which will also serve to ward off heavy rains.

T. peregrinum (*T. aduncum; T. canariense*—of gardens). — *Canary Creeper.* A well-known graceful climbing annual (or greenhouse perennial), native of Peru and Mexico. Leaves somewhat kidney-shaped, 3–5-lobed. Flowers from June to October, bright canary-yellow, rather small, but very numerous; petals narrow, the 3 lower ones fringed; spur hooked.

Culture &c. as above for *T. Lobbianum.* This species is grown in thousands every year, and is to be seen all over the country, hanging down from cottage windows, or climbing a trellis by the door, and utilised in various other ways. It likes partially shaded situations and plenty of moisture at the root, although it is essential to have the soil well drained.

T. polyphyllum (*Yellow Rock Indian Cress*).—A prostrate Chilian species, very free in growth. The trailing stems 3-4 ft. long are densely covered with stalked glaucous leaves each cut into about 8 obovate-lanceolate segments. Flowers in June, singly from the axils of the leaves, bright yellow, the 2 broader petals spotted with red. The variety *Leichtlini* (said to be a hybrid between *T. polyphyllum* and *T. edule*) differs chiefly in having deep orange-yellow flowers and less glaucous leaves.

This plant dies down in autumn, but its tuberous roots are best left undisturbed for a few seasons. The young shoots appear in early spring.

Culture &c. as above for *T. pentaphyllum.*

T. speciosum (*Flame Nasturtium*).—A splendid Chilian climber, with downy, hairy stems, and 6-lobed almost peltate leaves, downy beneath. Flowers from June to September and October, beautiful scarlet; petals obcordate, the upper ones narrowly wedge-shaped, the lower ones roundish. Spurl ong.

Culture and Propagation. — This species does not grow or flower equally well in all places. It does best in light deep loam, with the addition of peat, leaf soil and sand. In summer a mulching of well-rotted manure is beneficial. It dislikes a position where it is likely to be scorching hot, and should therefore be planted in a somewhat shaded place where there is plenty of moisture in the air—such as against bushes or hedges with a west or northern aspect. The tubers may be planted in April or May according to season and locality, and the plants may then be allowed to take care of themselves. If coddled too much they are likely to be a failure, but so long as the soil is well drained and fairly good, and the position partially shaded and not too cold, the plants will sooner or later establish themselves. As bearing these remarks out, the reader is referred to the observations on this species at p. 81.

T. tuberosum.—A beautiful tuberous-rooted climber, 2–4 ft. long, native of Peru, with smooth 5-lobed leaves, transversely truncate at the base. Flowers in late summer, scarlet and yellow, with entire or toothed petals.

Culture &c. as above for *T. pentaphyllum.* In unfavourable parts of the country it is safer to lift the tubers in autumn, and store them like Dahlias in a dry place for the winter.

LIMNANTHES.—A genus of 3 species of smooth, spreading annuals, with alternate, dissected leaves, without stipules, and axillary 1-flowered peduncles. Flowers regular, white, yellow, or rose. Sepals 5, valvate. Petals 5, twisted. Torus flattish, dilated, with 5 glands. Stamens 10, free, nearly perigynous. Fruit 5-lobed, indehiscent.

The following is the only species generally grown:—

L. Douglasi.—A showy Californian annual about 8 in. high, with pinnate leaves and stem trailing along the surface of the soil. Flowers from spring to autumn, yellow, passing into white streaked with grey, sweet-scented, about ¾ in. across. There are a few variations from the type in cultivation, the best known being *grandiflora*, which has somewhat larger flowers.

Culture and Propagation.—This species is useful for beds, borders or rockeries, and grows well in ordinary soil. Once established the seeds will sow themselves and reproduce young plants every year without trouble. When required in particular spots, seeds must of course be sown there in either March or September according to the time the flowers are wanted. In cold northern parts it will, however, be safer to sow the seeds at either of the periods mentioned in cold frames, afterwards pricking the seedlings out about the end of May.

BALBISIA.—A genus with only one species here described:—

B. verticillata.—A very ornamental Chilian evergreen shrub, 3–6 ft. high, with opposite or alternate, often 3-parted leaves, without stipules. Flowers late in summer, regular, yellow, solitary, on long stalks. Sepals and petals 5, the latter twisted, hypogynous. Stamens 10, hypogynous, free.

Culture and Propagation.—This shrub is hardy only in the mildest parts of the country, and should be protected from severe frosts. It may be increased by seeds, or by cuttings of the half-ripened wood, under a bell-glass or hand-light during the summer and autumn months. The rooted cuttings should be grown on in frames or greenhouses until mild weather in spring, when they may be planted out in warm sheltered positions. They like a well-drained sandy loam.

OXALIS (*Wood Sorrel*).—A large genus containing over 200 species, of which only a few are useful for outdoor gardening. They are herbs or rarely dwarf shrubs, with usually 3-lobed, Clover-like leaves. Flowers regular, on axillary or radical, one or more flowered stalks. Sepals and petals 5, the latter hypogynous, twisted in bud. Disc none. Stamens 10, free or united at the base. Styles 5, distinct, short, long or medium.

Culture and Propagation.—The Wood Sorrels thrive in a sandy soil in warm, dry places. They may be grown in masses in borders or beds, or in clumps here and there in the rockery. As many of the species have a bulb-like fleshy rootstock, the offsets from these may be used to increase the plants. The best time to divide the plants is in spring just as growth is about to commence. They increase very rapidly in favourable situations, but few except the native kinds can be regarded as hardy in the British Islands except in the mildest parts of the south and west. The foliage usually dies down in autumn, and if the tuberous kinds are planted 4–6 in. deep they will survive ordinary winters. In the event of severe frosts, a covering of coco-nut fibre, dry leaves &c. is advisable to protect the dormant roots. Seeds if obtainable may also be sown in spring in gentle heat, afterwards pricking the seedlings out.

There is only one drawback to most of the beautiful flowered Oxalis: and that is the peculiarity of closing their flowers except during the brightest sunshine. When fully expanded in the sun they present a really fine sight.

O. Acetosella (*Common Wood Sorrel; Stubwort*). — A native of moist, shady places in the British Islands. Leaves 3-lobed, with obcordate, somewhat downy leaflets. Flowers from April to August ½-¾ in. across, white, veined with purple. Some plants produce also a smaller and shorter stalked flower, which does not open, but fertilises itself and produces seed.

Culture &c. as above. Increased by division and seed. The young tender leaves are sometimes used as a salad.

O. arenaria.—A Chilian species about 4 in. high, with a rootstock of fleshy scales. Leaves with 3 or 4 two-lobed, obcordate leaflets, glaucous beneath. Flowers bright violet-purple, over an inch across, 3–10 on a stalk.

Culture &c. as above. Increased by division.

O. Bowiei. — A brilliant bulbous perennial 6–10 in. high, native of S. Africa. Leaves divided into 3 blunt obcordate lobes, slightly downy beneath. Flowers in summer, rich rosy-red, about 1½ in. across, yellowish inside at the base, several on a stalk.

Culture &c. as above. This fine species is often used for bedding out, making a rich border. Increased by division.

O. corniculata. — A small downy annual or biennial, found almost everywhere except the coldest regions. Leaves stipulate, 3-foliolate. Flowers from spring to autumn, yellow, with emarginate petals. The variety *rubra* has handsome bronzy foliage.

Culture &c. as above. Useful as a carpeting plant.

O. elegans.—This tufted species, about 6 in. high, is a native of the Andes at an elevation of about 7,000 ft. The leaves are composed of 3 wedge-shaped leaflets, about 1 in. long, green above, purple beneath. The rich purple flowers, each about 1 in. across, are produced in umbels of 6–9 during the summer months.

Culture &c. as above. This is quite hardy in favourable parts of the south and west.

O. enneaphylla.—A native of Fuegia about 4 in. high. Leaves with from 9 to 20 leaflets, usually in 2 series, smooth, glaucous, more or less wedge-shaped. Flowers in June, white or pale rose, nearly 1½ in. across, sometimes with pale purple veins and a watery green centre.

Culture &c. as above. This species has proved hardy at Kew, planted in the rockery in a rather moist and shaded position. It is best, however, protected from heavy rains during the winter sleep of its ovoid bulb-like tubers, the largest of which are sometimes 2 in. long.

O. floribunda (*O. rosea*).—A Chilian species 9–12 in. high, with 3-foliolate leaves. Leaflets obcordate. Flowers in summer, rosy, with darker veins.

Culture &c. as above.

O. hirta.—A very variable S. African species with thin decumbent leafy stems, each leaf being almost stalkless and cut into 3 narrow lobes about ½ in. long. The rich purple, lilac, or violet flowers are about 1½ in. across, and appear singly in the axils of the leaves. Sometimes the whole length of the stem—12–18 inches—is clothed with the blossoms, and the plant then looks charming.

Culture &c. as above.

O. lasiandra. — A beautiful Mexican species 9–18 in. high, with digitate leaves; leaflets 3 in. long, ovate spoon-shaped, wavy, spotted with crimson beneath. Flowers in summer, crimson, finely downy outside, about 20 on a stalk, and each about 1 in. across.

Culture &c. as above.

O. lobata.—A stemless Chilian species about 3 in. high, with 3-lobed leaves rather glaucous beneath. Flowers in late summer, bright yellow, spotted or pencilled with red in the centre.

Culture &c. as above. Increased by division.

O. luteola. — A bulbous-rooted South African species about 3 in. high, with 3-lobed leaves, having obcordate leaflets. Flowers from early spring to autumn, over an inch across when fully open, soft creamy-yellow, one on a stem.

Culture &c. as above.

O. stricta.—A North American species 1½ ft. high, naturalised in various parts of Britain, with 3-lobed leaves; leaflets obcordate. Flowers in summer and autumn, yellow, 2–6 on a stalk.

Culture &c. as above. Increased by division.

O. tetraphylla (*O. Deppei*).—A very handsome Mexican species, with large scaly, bulb-like rootstocks, and 4-lobed hairy leaves like a Maltese Cross, glaucous beneath. Flowers in summer, lurid red or purplish-violet, many on a stalk.

Culture &c. as above. Increased by division. The young leaves of this species may be eaten as a salad. The fleshy white roots are tender and juicy but somewhat tasteless.

O. valdiviensis.—A charming Chilian annual 6-8 in. high, with 3-lobed leaves, and deep yellow flowers, streaked with red, especially outside.

Culture &c. as above.

O. variabilis.—A native of the Cape with a large bulbous rootstock from which springs a tuft of shortly stalked leaves with 3 roundish dark green and usually hairy leaflets. The cup-like flowers are fully 2 in. across when fully open, and are borne singly on erect stalks about 3 in. high. The colour varies from purple to rosy-lilac, white, or white and yellow.

Culture &c. as above. Increased by division.

O. violacea.—A N. American species 3 in. high, with black spindle-shaped bulbs. Leaflets 3, obcordate, smooth, reddish underneath. Flowers from spring to autumn, pink, 3–9 on a stalk.

Culture &c. as above.

IMPATIENS (Touch-Me-Not).—A somewhat large genus of herbs, sometimes shrubs, usually smooth, rarely downy or hairy. Leaves alternate, opposite or radical, serrate or toothed, without stipules, often with glands at the base of the stalks. Peduncles axillary, solitary, or clustered, one- to many-flowered, the upper ones forming a terminal panicle. Flowers irregular. Sepals 3, very rarely 5, coloured, imbricated, 2 side ones flat, 2 front ones, when present, small, the upper one produced into a hollow spur. Petals 3, the front one outside concave, the side ones 2-cleft (formed of 2 petals united), the upper lobe exterior. Disc glands none. Stamens 5. Capsule 5-celled, the valves open suddenly and with elasticity.

Culture and Propagation. — The hardy species of Impatiens thrive in any garden soil and reproduce themselves annually without trouble, degenerating into vigorous weeds unless checked. They are scarcely suitable for the choice flower border, but may be utilised in the wilder parts of the garden or waste places. The cultivation of the Balsam—*I. Balsamina*—is specially noticed.

The British Yellow Balsam, *I. noli-me-tangere*, is found in moist, mountainous situations, and is a somewhat pretty plant. *I. tricornis* is an Indian annual, also with yellow flowers. It makes a bushy plant 3–5 ft. high, having purplish stems and oval oblong toothed leaves.

I. amphorata.—A Himalayan annual 3–6 ft. high, with succulent branching stems. Leaves bright green, often with pink edges and midrib, 3-6 in. long, broadly lance-shaped, pointed, finely crenate-serrate. Flowers in late summer, pale purple, suffused and speckled with rosy-red; racemes 2–5 in. long, many-flowered.

Culture &c. as above. Increased by seeds.

I. Balsamina (*Balsamina hortensis*). *Common Balsam.*—The wild species is a native of tropical Asia, 1–2 ft. high, with lance-shaped, serrated leaves. Flowers in summer, rosy-red.

This is the parent of the well-known Garden Balsam, at one time grown in immense quantities. The double-flowered varieties, such as the *Camellia-flowered*, *Rose-flowered*, *Solferino*, *Kermesina*, *alba*, *rosea*, *violacea* &c., variously striped and coloured, are chiefly grown, and when done well, are exceedingly handsome.

Culture and Propagation.—The seeds should be sown thinly in slight heat about the end of March in sandy, but not too rich, soil. When the seedlings are about 2 in. high, they should be put singly into 3-inch pots in fairly rich soil, with the roundish seed leaves close to the surface. By the end of May or beginning of June the plants will be ready for planting out in beds by themselves or in clumps in borders in warm, sunny positions, where they should receive plenty of water during the summer. They absorb water greedily, and are very sensitive to its absence. It is astonishing, however, to see the way in which plants which are almost shrivelled up for want of water will revive with a good soaking, and the tenacity of life in such a soft and juicy plant is really marvellous.

I. candida.—A showy Himalayan annual 6 ft. high, with narrow lance-shaped pointed leaves, in whorls of three, and pink, serrated edges. Flowers in late summer, white, slightly speckled with crimson.

Culture &c. as above. Seeds may be sown indoors as recommended for the Balsam, or in the open air in April and May.

I. fulva.—A N. American annual 2–4 ft. high, with ovate, coarsely toothed leaves. Flowers from June to September, orange-yellow, thickly spotted with reddish-brown.

Culture &c. as above. This species is now naturalised in the British Islands.

I. glandulifera.—A native of Ceylon 4-6 ft. high, with lance-shaped, glandularly serrate leaves in whorls; stipules glandular. Flowers in summer, rosy. This species spreads rapidly in gardens.

Culture &c. as above.

I. Roylei.—An Indian annual 6–10 ft. high, with more or less lance-shaped, sharply serrated leaves in whorls. Flowers in summer, purple. There are two or three forms of this species, which has been confused with the preceding one.

Culture &c. as above.

XXIX. RUTACEÆ—Rue Order

A large order containing about 650 species of shrubs or trees, very rarely herbs, remarkable for having numerous glandular spots on the leaves and flowers, often containing pungent, strongly scented, bitter juices. Leaves without stipules, often opposite, simple or often compound, 1–3–5-foliolate or pinnate, very often entire, occasionally serrulate. Inflorescence various, very rarely spicate or umbellate, usually cymose and axillary. Flowers usually hermaphrodite. Sepals 4–5, imbricate, free or united. Petals 4–5, hypogynous or perigynous, broadly imbricated, rarely valvate. Stamens inserted at the base or on the edge of the disc, 4–5, or 8–10, rarely fewer or more, free, or rarely cohering or united to the petals. Styles short or long, distinct or connate. Fruit a capsule or berry, rarely a drupe.

RUTA (**Rue**).—A genus of about 40 species of strong-smelling perennial herbs or undershrubs with round, branching stems, and alternate, simple, 3-foliolate, pinnatisect or decompound leaves. Flowers yellow or greenish, usually cymose. Calyx 4–5-lobed or parted, persistent. Petals 4-5, often toothed or ciliated, imbricated. Disc thick, urn-shaped, with 8–10 glands or pits. Stamens 8–10 inserted at the base of the disc, one short, one long, alternately.

Culture and Propagation.—The Rues thrive in light, rich soil, but only a few are of any garden value. They may be increased by seeds or cuttings in a shady border. The seeds may be sown out of doors as soon as ripe or in spring, afterwards pricking the seedlings out about 6 in. apart when well above the surface. As the plants increase in size they require more space, but transplanting should only be done in mild weather in spring or autumn. Cuttings of the ripened shoots will root freely in autumn, especially if placed in a cold frame or under a hand-light. Sometimes old bushy plants may be divided. Once established in a garden the Rues may be allowed to look after themselves for years. If cut back every two or three years, new and vigorous shoots will be developed.

R. albiflora (*Bœnninghausenia albiflora*).—An elegant downy plant 2 ft. high, native of Nepaul. Leaves very much cut and finely divided, glaucous, pubescent. Flowers borne in great profusion from July to September, white; petals entire, shorter than the stamens.

Culture &c. as above.

R. graveolens (*Common Rue; Countryman's Treacle; Herb of Grace*). A well-known glaucous perennial 2-3 ft. high, native of S. Europe, found in almost every garden, no doubt chiefly on account of its medicinal virtues. Leaves much divided into oblong-obovate segments.

Flowers from June to September, greenish with entire or slightly toothed, boat-shaped petals.

Culture &c. as above. The leaves are sometimes used for seasoning.

DICTAMNUS (*Dittany; Burning Bush; Fraxinella*).—A genus with only one species:—

D. **Fraxinella.** — A strong-smelling herb, shrubby at the base, 1–2 ft. high, native of S. Europe, with alternate unequally pinnate leaves, having 4–5 pairs of finely serrulated leaflets. Flowers from May to July, pale lilac-rose, feathered with purple veins. The variety *alba* has white, unveined flowers, and white stamens with yellow anthers. Calyx 5-parted, deciduous, lower segments longest. Petals 5, the 4 upper ones ascending in pairs, the lower one bent downwards. Disc annular, fleshy. Stamens 10, bent down, free, inserted with the petals at the base of the disc.

Culture and Propagation. — This plant thrives in light, loamy, well-drained soil, and in partially shaded situations. It may be increased either by seeds sown as soon as ripe, or better still by cutting the fleshy roots into pieces in the spring. The seeds may be sown in cold frames, but very often will not germinate until the following spring. The seedlings are then pricked out into light rich soil, and grown on with one or two removals until they are large enough for the flower border. It takes two or three years to obtain good flowering plants from seeds. The Dictamnus may also be increased by cuttings of the root about 2 in. long inserted in light rich soil in gentle bottom heat early in the year. They produce good plants quicker than seeds.

As ornamental border plants, both the red and white forms of *D. Fraxinella* may be placed in the front rank for the beauty and profusion of their flowers, and the generally beautiful aspect when well established. One of the most remarkable features of the plants, especially during the flowering season, is the fact that the fragrant oil or resin which exudes from the rusty-coloured glands is capable of being ignited on a dark summer's night. The plant may thus easily be distinguished from all others in the vicinity, not only by this phenomenon, but also by the very strong and at the same time agreeable odour which pervades the atmosphere.

CHOISYA (Mexican Orange Flower).—There is only one species in this genus:—

C. **ternata.** — A beautiful Mexican shrub 4-10 ft. high, readily recognised by its opposite, ternate, smooth, shining green leaves, full of pellucid dots. Flowers in summer, white, sweet-scented, freely produced on axillary stalks near the ends of the branches, and reminding one of those of the orange. Sepals 5, membranous, deciduous, imbricate. Petals 5, membranous, spreading, oblong. Stamens 10, inserted at the base of the disc, the alternate ones longer. Disc columnar, thick, erect, hairy.

Culture and Propagation.—This fine shrub thrives in light, rich soil with a south or west aspect, and will soon make a good bush in congenial quarters. It may also be grown against a wall, and if not hacked about too much with the knife its shoots will be laden annually with clusters of sweet-scented Orange-like blossoms.

Ripened cuttings strike freely in sandy soil under a glass in gentle heat during spring or early summer. Layers may also be made. In the mild southern parts of the kingdom, as in Cornwall, the Mexican Orange often flowers twice and sometimes three times a year, and will bear several degrees of frost without injury. In such places cuttings may be also freely rooted in cold frames or even in the open border.

ZANTHOXYLUM (Toothache Tree; Prickly Ash). — This genus is sometimes spelt *Xanthoxylum* or *Xanthoxylon*. It contains about 80 species of smooth or downy shrubs or trees, with or without spines or prickles. The alternate leaves are unequally pinnate or 3-foliolate, and the small white or greenish polygamous flowers are borne in axillary or terminal cymes or clusters. Calyx 3–5-cleft. Petals 3–5, very rarely none. Stamens 3–5, hypogynous. Carpels 1–5, oblique, 1-celled, becoming dry or juicy fruits when ripe.

Z. **americanum.**—This is the common Toothache Tree of N. America. It grows 12–15 ft. high, and its leaves are composed of 9-11 ovate and slightly serrate leaflets, the roundish leaf stalks being furnished with prickly stipules at the base. The small whitish flowers are produced in clusters in the leaf axils about March and April.

Culture and Propagation. — This species will grow in ordinary good garden soil, and may be used in shrubberies, although it is scarcely worth planting when so many better trees are now in cultivation. It may be increased by rooting cuttings of the ripened shoots under a handlight or in a cold frame in sandy soil.

PTELEA. — A genus containing 6 species of unarmed shrubs or small trees with bitter bark. Leaves alternate, rarely opposite, 3-foliolate or pinnately 5-foliolate; leaflets ovate or oblong with pellucid dots, entire or serrate. Flowers polygamous, cymose or corymbose. Calyx short, 4-5-parted, imbricate. Petals 4-5, much longer than the calyx, imbricate. In the male flowers disc inconspicuous; stamens 4-5. In the female flowers, stamens effete, disc short. Style short; stigma 2-3-lobed. Fruit roundish, broadly 2-3-winged, 2-3-celled, indehiscent.

P. trifoliata (*Hop-tree; Swamp Dogwood*).—A N. American shrub 4-8 ft. high, with 3-foliolate, yellowish, long-stalked leaves, which suggest Hops when bruised. Flowers in early summer, small, greenish; filaments densely hairy below the middle, longer than the style in the sterile flowers, shorter in the fertile ones. The variety *aurea* has beautiful golden-yellow foliage when young. The winged seed vessels are very attractive and bear a superficial resemblance to the fruits of the common Elm, but are much larger, and 3-winged, each wing being handsomely veined with a conspicuous branching network.

Culture and Propagation.—This ornamental shrub will flourish in ordinary good garden soil and may be increased by inserting cuttings of the ripened or half-ripened shoots in sandy soil under a handlight. Seeds are freely produced and new plants may be raised from these if sown as soon as ripe in cold frames.

SKIMMIA.—A genus of about half-a-dozen species of very smooth evergreen shrubs, with alternate, simple, stalked lance-shaped, entire, leathery leaves, pellucidly dotted. Flowers clustered in branched terminal panicles. Calyx short, 4-5-lobed, imbricate. Petals 4-5, oblong, much longer than the calyx, valvate or slightly imbricate. Disc inconspicuous. Stamens 4-5, hypogynous, effete in the female flowers. Fruit an ovoid, fleshy, 2-4-stoned drupe.

Culture and Propagation.—Skimmias thrive in a good loam and peat soil, well-drained. They are increased by cuttings in sandy soil under a bell-glass in heat, or from seeds sown as soon as ripe. The branches may be also layered. As border plants or in beds by themselves, they look very effective, especially when covered with bright red berries. For town gardens the Skimmias are excellent plants, as their smooth deep green foliage is uninjured by grime or dirt, while the beautiful coloured berries peeping out here and there render them extremely ornamental in autumn and winter.

S. Fortunei. — A pretty Japanese species 3-4 ft. high, with its deep glossy green Laurel-like leaves 3-4 in. long, and white or greenish-white flowers, followed by scarlet or dull crimson berries in the autumn.

This plant has been called *S. japonica* for many years. As a good deal of confusion still exists regarding the names of the cultivated Skimmias, it may be as well to point out that *S. Fortunei* (of Masters) differs from *S. japonica* (of Thunberg) in its dwarfer habit, the deep green colour of its lance-shaped leaves, and in having always hermaphrodite flowers, that is blossoms containing stamens and pistil. *S. Fortunei* also bears its ornamental berries with great freedom, whereas *S. japonica* does not unless carefully fertilised. The variety *argentea* has the leaves margined with white, while *rubella* is distinguished from the type by the reddish tints of the flower buds.

Culture &c. as above.

S. japonica.—Until a few years ago this species went under the name of *S. oblata.* It is a beautiful Japanese shrub 2-3 ft. high, with bright green elliptic-obovate leaves 3-5 in. long, borne close together on the branches and giving the plant a dense bushy appearance. The flowers are sometimes hermaphrodite and staminate only on the same plant; but sometimes a plant bears female flowers (pistils) only, and sometimes male flowers (stamens) only. Plants with male flowers only never bear any berries, while female flowers must be fertilised with pollen, or they will be equally barren.

There are many forms of *S. japonica* in gardens, and they were at one time regarded more or less as distinct species. The best known are *S. fragrans*, *S. fra-*

grantissima, *S. Foremani*, *S. macrophylla*, *S. intermedia* and *S. oblata ovata*.
Culture &c. as above.

S. Laureola (*Laureola fragrans*).—A somewhat ornamental Himalayan shrub with a rather strong if not actually disagreeable odour, by which it may be readily distinguished from its more popular relatives. It grows 3–4 ft. high, and has deep green oblong lance-shaped leaves, 3–5 in. long, narrowed at each end and yellowish-green beneath. The pale yellow strongly scented flowers appear in spring, and are replaced in autumn by smooth ovoid berries resembling the fruits of the Olive.

Culture &c. as above. This species is not very much grown, and is not nearly so hardy as the other kinds mentioned. It is fairly hardy in the Thames Valley, but in more northern parts would probably require protection in severe winters.

S. Rogersi.—This is probably a hybrid between *S. Fortunei* and *S. japonica*. It has greenish or dull purple shoots furnished with more or less lance-shaped leaves 3 in. or so in length, with margins slightly recurved. The flowers are usually hermaphrodite as in *S. Fortunei* and are succeeded by large deep crimson berries in autumn.

Culture &c. as above.

CITRUS (ORANGE).—A genus of trees or shrubs often spiny, with alternate dotted leaves, having a winged stalk jointed with the blade. Flowers hermaphrodite, very fragrant. Calyx cup-shaped or urn-shaped, 3–5-cleft. Petals 4–8, linear oblong, thick, imbricate. Stamens 20–60, variously united, or in many bundles. Disc large, cup-shaped, ringed; style smooth, deciduous, with a capitate, lobed stigma. Fruit a globose or oblong, fleshy, many-celled berry, with a rind, of which the Orange and Citron are good examples.

Culture and Propagation. — The species of Orange mentioned below are the only ones which can be grown out of doors in this country in the mildest parts, and even they require protection in severe winters. They are worth growing for their appearance—glossy green leaves with a profusion of white-scented flowers and sometimes many fruits. They will flourish in good garden soil, and are best sheltered from the cold winds from the north and east. Fresh plants may be obtained by means of seeds sown as soon as ripe in gentle heat. Cuttings of the plump and firm young shoots may also be inserted in sandy soil in gentle heat under a bell-glass until rooted. The branches may also be layered out of doors in autumn and budding and grafting may be performed on stocks raised from seed.

C. japonica (*Kumquat*). — A shrub 4–6 ft. high, native of China and Japan, with bright yellow fruit. It requires plenty of water in summer, but should be kept dry in winter. It is frequently grafted on *C. trifoliata*.

Culture &c. as above.

C. trifoliata (*Pseudægle sepiaria*).—A Japanese shrub 4 ft. high, with trifoliolate leaves, fragrant white flowers produced in April and May, and orange-yellow fruits about 1½ in. in diameter.

Culture &c. as above. In the neighbourhood of London this species has proved to be perfectly hardy in ordinary winters in open unprotected situations. The flowers appear before the leaves, the latter not attaining their full size until about the end of June.

XXX. SIMARUBEÆ—Tree of Heaven Order

A natural order containing over 100 species of scentless shrubs or trees, often tall, sometimes herbs, with more or less bitter bark. Leaves alternate, or rarely opposite, pinnate, rarely 1–3-foliolate or simple, leaflets without spots, rarely glandular. Stipules none. Inflorescence usually axillary, panicled or racemose, rarely spicate, or a solitary flower. Flowers diclinous or polygamous, rarely hermaphrodite, regular, usually small. Calyx 3–5-lobed or parted. Petals 3–5, very rarely absent, imbricate or valvate. Disc rarely absent, ringed, cup-shaped or elongated into a gynophore, entire or lobed.

Stamens inserted at the base of the disc, as many, or twice as many, as the petals, very rarely numerous; filaments free, naked, hairy, or scaly at the base. Styles 2–5. Fruit a drupe, capsule, or samara.

AILANTHUS (Tree of Heaven).—A genus with 8 species of more or less fetid trees having unequally pinnate leaves, and small polygamous flowers in terminal panicles. Calyx equally 5-lobed. Petals 5, spreading. Disc 10-lobed. Stamens 10 (absent in female flowers, 2–3 in hermaphrodite ones). Fruit of 1–5 linear oblong 1-seeded samaras.

A. glandulosa.—A handsome Chinese tree reaching a height of 60 feet in a wild state, with large, pinnate, deciduous leaves 1–3 ft. long, having 9–25 deeply toothed or lobed leaflets. Flowers in August, whitish-green, in large branched terminal, clustered panicles, emitting a disagreeable smell. They are succeeded by oblong purple-brown winged and peculiarly twisted fruits which give the plant a very ornamental appearance.

Culture and Propagation.—This is a fine tree for the lawn or park, and thrives in a light, loamy, well-drained soil. For the first 10 or 12 years it grows rapidly in favourable spots. It is easily increased by slips of the roots or by means of the suckers which are thrown up from the base in great abundance, and sometimes produce simple instead of compound leaves. Seeds are freely produced by the female flowers, and from them plants may also be obtained if sown in cold frames as soon as ripe.

CNEORUM (Widow Wail).—A small genus of ornamental under-shrubs with alternate entire leathery leaves and axillary cymes of small hermaphrodite flowers. Sepals and petals 3–4. Receptacle elongated, columnar, 3–4-ribbed. Stamens 3–4, shorter than the elongated suberect petals, and inserted on the middle of the receptacle. Fruit consists of 1–4 roundish drupe-like cocci.

C. tricoccum.—A smooth S. European shrub 1–2 ft. high, with more or less linear oblong leaves and clusters of yellow bell-shaped flowers borne in the axils during the summer months and replaced in autumn by the 3-lobed fruits.

Culture and Propagation. — This species is fairly hardy in the neighbourhood of London when grown in warm sheltered positions. It grows well in ordinary good garden soil, but prefers a mixture of sandy loam and a little peat. Cuttings of the young and fairly well-ripened shoots will root freely in sandy soil under a handlight, especially if placed in gentle bottom heat. In the colder parts of the kingdom this species would require protection in winter. *C. pulverulentum* from the Canary Islands may be recognised by the greyish powder on its leaves and branches. It is very rarely seen.

XXXI. ILICINEÆ—Holly Order

A natural order of 3 genera and about 150 species, mostly smooth and evergreen trees or shrubs. Leaves usually alternate, without stipules, stalked, simple, leathery, often entire. Flowers small, regular, hermaphrodite, polygamous, diœcious, or unisexual, in axillary or terminal cymes or clusters. Calyx 3–6-partite, imbricate, often persistent. Petals 4–5, rarely more, free or united at the base, hypogynous, deciduous. Stamens usually 4–5, hypogynous, free or slightly adhering to the base of the petals. Fruit a somewhat fleshy drupe, with 3–8 stones or 'pyrenes.'

ILEX (Holly).—A genus containing about 145 species of trees or shrubs, with alternate, often shining, entire, toothed or spiny leaves. Peduncles axillary, few-flowered, or often branched. Flowers white, often hermaphrodite. Calyx small, 4–5-cleft. Corolla rotate 4- (rarely 5–6-) parted. Fruit a globose drupe with 4–8 stones.

I. Aquifolium (*Common Holly*). — A British and European tree 10–40 ft. high, with ovate or oblong acute, shining, wavy, spiny-toothed, deep green leaves. Flowers in May and June on short axillary stalks, succeeded by round red berries.

The Holly is at all seasons of the year an ornamental tree, but particularly so in winter when it is covered with its numerous scarlet berries nestling among the dark green, shining foliage. Its value for hedge-making is well known, and in bygone days it was clipped into all kinds of fantastic and unnatural shapes. On the lawn some varieties standing alone are very effective.

Culture and Propagation.—The Hollies thrive in good loamy soil, and are best transplanted early in the autumn, so that a few new roots may be made before the frosts of winter set in.

Plants may be raised from seeds, which should be buried in sand until spring and then sown, in beds or drills, covered with about 1 in. of soil, where they will not get parched. The seedlings should not be touched for 2 years, after which they may be transplanted in autumn, about 1 ft. apart, and remain for another 2 years, and again transplant. The special varieties are usually grafted in March on stocks of the Common Holly raised from seed; or are budded in May with a sprouting bud, or in August with a dormant one. The amateur, however, unless he has much time at his disposal, will leave the propagation of Hollies to the nurseryman, and pay a few pence for well-established specimens.

There are many varieties of *I. Aquifolium*, some with green leaves, some with silver and gold variegation, all more or less worthy of cultivation. Most of them have scarlet berries, but the variety *fructu-albo* has white berries; *fructu-luteo*, yellow berries; *fructu-nigro*, black. In the Kew Handlist of trees and shrubs as many as 53 varieties of the Common Holly are enumerated, and many of them are known under other names as well. The following contain some of the best varieties of the Common Holly arranged according to the colouring of the foliage:—

GREEN-LEAVED HOLLIES.—*Altaclerensis*, *angustifolia*, *Beeti*, *ciliata*, *crassifolia*, *donningtonensis*, *ferox* (*Hedgehog Holly*), *Foxi*, *handsworthiana*, *hastata*, *Hendersoni*, *heterophylla*, *Hodginsi*, *latissima*, *laurifolia*, *maderensis*, *minorca* (or *balearica*), *monstrosa*, *myrtifolia*, *nobilis*, *oblata*, *ovata*, *scotica*, *serratifolia*, *Shepherdi*, *sinescens*, and *whittingtonensis*.

GOLD-LEAVED HOLLIES.—*Aurantiaca*, *aureo-marginata*, *aureo-picta*, *aureo-pumila*, *brevifolia*, *Cooki*, *ferox aurea*, *laurifolia*, *luteo-maculata*, *myrtifolia aurea*, *obscura*, *pendula aureo-marginata*, *speciosa* (or *Golden Queen*), *tortuosa aureo-picta*, and *Webbiana*.

SILVER-LEAVED HOLLIES.—*Argentea regina*, *argenteo-marginata*, *argentea medio-picta*, *ferox argenteo-marginata*, *handsworthensis argentea*, *Ingrami*, *lucida* (or *Silver Queen*), *pendula albo-picta*.

There are a few other Hollies in cultivation, but few of them equal in beauty or hardiness the many forms of our Common Holly. The following are some of the best:—

I. cornuta.—A handsome Chinese Holly with stiffish deep green leaves usually furnished with 3 horn-like spines at the apical end, and often with 2 more at the base, especially when young. The small flowers appear in early summer and are succeeded in favourable seasons by bright red berries about ⅜ in. in diameter.

Culture &c. as above.

I. crenata.—A pretty compact-growing Japanese Holly with small bluntly ovate crenate leaves with more or less revolute margins. The variety *major* (or *Fortunei*) is a more vigorous-growing plant than the type, and may be recognised by its rounder leaves. The variety *variegata* has the leaves blotched or marbled with dull yellow.

Culture &c. as above.

I. dipyrena.—A very ornamental tree 12–15 ft. high, native of the Himalayas. The angular shoots are clothed with elliptic-oblong tapering leaves 3–4 in. long with spiny serrate cartilaginous margins. The upper surface is deep almost blackish-green, and is in striking contrast to the bright yellowish-green of the under surface, which is traversed by a prominent whitish-green midrib. The small flowers are succeeded by dark brown 2-seeded berries.

Culture &c. as above. A good lawn or park tree.

I. glabra (*Prinos glaber*).—This is the 'Inkberry' of the United States. It grows 2–3 ft. high, and has smooth ovate lance-shaped leaves, with a few spiny teeth near the apex.

Culture &c. as above. Useful for shrubberies.

I. latifolia. — A handsome Japanese tree about 20 ft. high, with bluntly ovate serrate leaves of a deep shining green above, paler beneath. It makes a good specimen plant on grass land.

Culture &c. as above.

I. opaca.—This ornamental tree is a native of the Eastern United States and reaches a height of 20–40 ft., and may be recognised by its flattish oval leaves, the wavy edges of which are sparingly furnished with spiny teeth.

Culture &c. as above.

Other species of Holly in cultivation, but rarely met with, are *I. ambigua*, *I. Amelanchier*, *I. Cassine*, *I. Dahoon*, *I. decidua*, *I. lævigata*, and *I. verticillata*, all from the United States and N. America; and *I. integra* and *I. rotunda*, natives of China and Japan.

NEMOPANTHES.—A genus containing a single species:—

N. canadensis (*Ilex canadensis; Prinos integrifolius*).—This is a smooth-branched shrub about 8 ft. high, with alternate, slenderly stalked, oblong, deciduous, entire or slightly toothed leaves. Flowers small, polygamous, white. Calyx in the male flowers minute, 4–5-toothed; in the female flowers absent. Petals 4–5, distinct, linear, spreading. Stamens 4–5. Fruit a light red drupe with 4 or 5 bony nutlets.

Culture and Propagation. — This species thrives in cold, damp, shady places, and is most readily increased by seeds. These may be sown in cold frames as soon as ripe, and the young plants treated in the same way as recommended for Hollies above.

XXXII. CELASTRINEÆ—Spindle Tree Order

An order of small shrubs or trees sometimes spinescent or climbing. Leaves opposite and alternate, often leathery, always simple, sometimes lobed. Stipules minute when present. Flowers very small, greenish or white, often hermaphrodite. Calyx 4–5-lobed or parted. Petals 4–5, imbricate. Stamens 3–5 (very rarely 2–10). Fruit a capsular berry, drupe, or samara.

EUONYMUS (Spindle Tree).—A genus with about 40 species of erect or rarely climbing, usually smooth, evergreen or deciduous trees or shrubs, with opposite, stalked, entire or toothed leaves. Calyx, petals, and stamens have the characters of the order. Fruit a 3–5-celled, angled or winged, leathery, often warted capsule. Seeds enclosed in an aril.

Culture and Propagation.—The green, and variegated green and gold and silver Spindle Trees are familiar objects in British gardens. They all grow freely in any kind of soil. I have seen some small plants send their roots through the chinks of a wooden box into a gravel path, and grow into fine bushes, with the box still adhering to the base. For hiding old walls, fences, or unsightly parts of the garden, the Spindle Trees are very useful. They are easily increased by inserting the ripened tips of the branches about 3 in. long into a fine sandy loam in autumn, keeping them damp and fresh with a frequent spraying overhead. To obtain bushy specimens, the tips of the leading shoots must be pinched out. This will induce the development of side branches, the tips of which may likewise be pinched out if a still more bushy habit is required.

E. americanus (*Burning Bush; Strawberry Bush*).—A deciduous N. American shrub 2–6 ft. high, with smooth, 4-angled branches, and ovate oblong-lance-shaped, serrate leaves, almost sessile. Flowers in June, greenish-purple. Fruit scarlet. The variety *obovatus* is chiefly distinguished by having obovate leaves.

Culture &c. as above.

E. atropurpureus (*Waahoo*).—A smooth-branched N. American species 6–14 ft. high, with ovate-oblong, pointed, serrate, stalked leaves, and dark purple flowers in June.

Culture &c. as above.

E. europæus (*Common Spindle Tree*). A smooth, fetid, native deciduous shrub, 5–20 ft. high, with ovate-lance-shaped, finely serrate leaves, and small greenish-white flowers in May, followed by an abundance of bright pink fruits, which open when ripe and reveal the orange-coloured aril. There is a white-fruited variety, one with scarlet leaves in autumn, and *nanus* or *pumilus*, a dwarf form, rarely exceeding 2 ft. high. Other forms are *atropurpureus*, *aucubæfolius*, *foliis argenteo-variegatis*, and *foliis aureo-variegatis*. The Common Spindle Tree is much used as a stock for grafting the choicer varieties. Some of its forms are handsome objects in autumn owing to the brilliant colouring of the foliage.

Culture &c. as above.

E. fimbriatus. — A distinct evergreen shrub, about 12 ft. high, native of Japan, India &c. Branches round, smooth, with ovate-pointed leaves fringed with long, parallel, serrated teeth. There are varieties with variegated leaves but somewhat tender.

Culture and Propagation. — This species is usually grown in greenhouses, as it is usually killed by a few degrees of frost if grown in the open air. It is suitable for the open air only in the very mildest parts of the kingdom, and may be increased by cuttings of the tops of the shoots like the other species.

E. japonicus.—A handsome evergreen shrub about 20 ft. high, native of Japan, India &c., with oval-oblong, lance-shaped, deep green, leathery, shiny leaves, sharply serrated and pointed. Flowers in April, white.

This species has given rise to a large number of very beautiful varieties with yellow, white, and tinges of red in the foliage, and the names are sufficiently indicative of the colouring, as *albo-marginatus*, *aureo-marginatus*, *latifolius albus*, *latifolius aureus* &c.

Culture &c. as above.

E. latifolius.—A distinct and beautiful deciduous Japanese species 6–8 ft. high, with broad, ovate, finely toothed leaves. Flowers in June, white at first, becoming purple with age. Fruits deep red; arils orange. Thrives in shady places.

Culture &c. as above. This species is perfectly hardy, and in August and September it is singularly attractive on account of its numerous racemes of bright red fruits hanging from thread-like stalks. It is easily increased from seeds.

E. radicans.—This is a distinct Japanese species with small, oblong or rounded, serrate leaves; its sub-variety *variegata* is often used as an edging, but does well trained up against a wall. Other pretty forms are *Silver Gem*, *foliis pictis*, *roseo-argenteis*, the latter having a decided tinge of red or rose mixed with the green and white.

Culture &c. as above. This species and its varieties make excellent edgings for beds and borders and may be kept within bounds by means of the shears, the use of which in no way detracts from their appearance.

E. verrucosus.—A deciduous European species with warty stems, and somewhat ovate leaves. Flowers in May, greenish-white or yellow.

Culture &c. as above.

PACHYSTIMA.—A small genus of very smooth evergreen shrubs with small, opposite, shortly stalked leathery leaves, minute deciduous stipules, and solitary or clustered greenish flowers in the axils of the leaves. Calyx tube obconical, 4-angled, with 4 rounded lobes. Petals 4, roundish, spreading. Stamens 4, inserted beneath the large flat 4-angled disc. Capsule oblong, flattened, seeds with a whitish membranous aril.

Culture and Propagation.—The plants belonging to this little-known genus will thrive in ordinary good and well-drained garden soil, and may be used in the shrubbery. Cuttings of the more or less ripened shoots will root in autumn in sandy soil if placed under a handlight or in a cold frame, and thus protected during the winter months.

P. Canbyi.—This rather pretty species is a native of the mountains of North Carolina and Virginia, and its somewhat creeping twiggy stems are furnished with oblong linear leaves having slightly toothed margins. The small reddish flowers appear in summer.

Culture &c. as above.

P. Myrsinites (*Myginda myrtifolia*). This shrub is a native of the mountainous regions of N.W. America, and grows 1–2 ft. high. It has small leathery leaves with more or less serrate or entire margins, and greenish flowers, produced in summer.

Culture &c. as above.

CELASTRUS (STAFF VINE). — A genus of often climbing, unarmed shrubs, with alternate, stalked, entire or toothed leaves. Flowers sometimes unisexual. Calyx urn-shaped at the base, 5-cleft. Petals 5, inserted under the disc. Stamens 5, inserted in the sinuses of the cup-shaped or concave 5-lobed disc. Capsule roundish, globose, or oblong, leathery. Seeds inclosed in an aril.

C. Orixa (*Orixa japonica*).—A Japanese shrub 6–9 ft. high, with elliptic or obovate glossy green leaves having entire edges. The small greenish flowers are produced in summer, the males usually being in racemes, the females solitary and long-stalked.

Culture and Propagation. — This species is hardy in the neighbourhood of London, and like the better known *C. scandens* will thrive in ordinary good garden soil in sheltered positions. It may be increased by layers.

C. scandens (*Climbing Waxwork; Bitter Sweet*).—A deciduous N. American climber, 12–15 ft. high, with ovate-pointed, serrated leaves 3 in. long, 2 in. broad. Flowers in early summer, pale yellow, in terminal racemes, succeeded by 3-angled, 3-seeded orange berries.

Culture and Propagation. — This species thrives in ordinary soil, and is increased by layering the young shoots in autumn. Seeds may also be sown in cold frames as soon as ripe, and as soon as large enough the following spring they may be moved into a prepared bed of good garden soil outside. For covering arbours or trellises with its masses of glossy foliage in summer, and bright berries in autumn, it is very effective.

MAYTENUS.—A rather large but not well-known genus of evergreen bushes or shrubs, with alternate and often 2-ranked, stalked, leathery, serrate leaves, and minute deciduous stipules. Flowers small, polygamous, white, yellow, or reddish, borne in the axils of the leaves, either solitary or in clusters or cymes. Calyx 5-cleft. Petals spreading. Stamens 5, inserted beneath the roundish wavy-edged disc. Capsule leathery, 1–3-celled. Seeds with a pulpy aril.

M. chilensis.—A Chilian shrub 6–10 ft. high, with elliptic oblong serrate leaves, tapering at each end. The greenish-yellow flowers appear in early summer and are not particularly attractive.

Culture and Propagation. — This species is probably unknown outside botanic gardens. It grows in ordinary good garden soil in warm and sheltered positions protected from the north and east winds. It may be increased by layering the shoots in late summer or autumn, or by placing cuttings of the ripened shoots in sandy soil under a handlight in autumn. It is fairly hardy in the neighbourhood of London.

XXXIII. RHAMNEÆ—Buckthorn Order

An order of erect or climbing trees or shrubs, often spiny, rarely tendrilled or glandulose, with alternate, simple, usually stipulate leaves, often 3–5-nerved, entire or serrate. Flowers usually hermaphrodite, often in loose or dense axillary cymes. Calyx-tube leathery, 4–5-lobed. Petals 4–5, or none. Stamens 4–5 inserted with the petals in the throat of the calyx. Fruit capsular or drupe-like.

PALIURUS (CHRIST'S THORN).—A genus of sub-erect or decumbent smooth or slightly tomentose shrubs, armed with stipular spines. Calyx-tube 5-cleft, broadly obconical. Petals 5, small, hooded, often deflexed. Disc 5-lobed. Stamens 5, enclosed by the petals or projecting beyond them.

P. aculeatus.—A prickly shrub about 8 ft. high, native of the Mediterranean region. Leaves ovate, serrulate, smooth, 3-nerved, with 2 spines at the base, one erect, the other hooked. Flowers in summer, greenish-yellow. Fruit like a head with a broad-brimmed hat. The appropriate name of *aculeatus* has now been dropped by botanists, who call this plant *P. australis*, the latter name referring to its habitat in S. Europe.

Culture and Propagation. — This species, as well as *Zizyphus spina-Christi*, is supposed to have supplied the crown of thorns placed on our Lord's head. It grows freely in ordinary soil, and may be increased by layers, cuttings of the roots, or seeds in late summer or autumn. The root cuttings and seeds are best treated under protection in cold frames or under handlights. In very severe winters the tips of the branches are likely to suffer.

BERCHEMIA.—This genus contains about 10 species of erect or often high-climbing shrubs, having alternate stalked leathery, feather-veined leaves, and small deciduous stipules. The small flowers (which are sometimes polygamous, although usually hermaphrodite) are borne either singly or in clusters in the axils of the upper leaves, or in panicles at the end of the shoots. Calyx 5-cleft with a hemispherical or top-shaped tube. Petals 5, obovate or lance-shaped, hooded. Stamens 5. Fruit a blackish or purple drupe.

B. volubilis (*Rhamnus scandens; R. volubilis*).—A rather pretty deciduous climber native of the Southern United States. Its smooth branches are furnished with slightly wavy oval leaves having a short sharp point. The small greenish-white flowers are borne in summer in the axils of the leaves and also at the end of the shoots, and are succeeded in autumn by oblong violet or purple fruits.

Culture and Propagation.—This species is hardy in most parts of the kingdom, and will grow in ordinary good garden soil. It may be utilised for training over tree stumps, bowers, trellises &c. in the rougher parts of the garden. It is increased by inserting cuttings of the ripened shoots, and also of the roots, in sandy soil under a handlight in autumn, or in gentle bottom heat. The branches may also be layered during the late summer and autumn.

RHAMNUS (Buckthorn).—A genus with about 60 species of evergreen or deciduous trees or shrubs. Flowers in axillary cymes, often unisexual. Calyx-tube urn-shaped, 5-cleft. Petals 4–5, or none. Stamens 4–5, with very short filaments. Fruit a berry-like drupe, oblong or globose.

Culture and Propagation.—The Buckthorns grow well in ordinary garden soil, and may be increased by layers in autumn or cuttings of the ripened shoots inserted in sandy soil under a handlight or in a cold frame. Seeds of many of the Buckthorns are ripened freely in the British Islands, and fresh plants may be obtained by sowing these as soon as ripe, or in spring in cold frames.

R. Alaternus.—A native of the southern coasts of Europe, about 20 ft. high, with ovate-elliptic or lance-shaped, leathery, serrated leaves. Flowers from April to June, green, diœcious; petals absent. There is a variegated form having the leaves broadly edged with silvery white, and also one called *latifolius* with broader leaves than the type.

Culture &c. as above. Ripens seeds freely.

R. alpinus.—A European shrub, 4 ft. high, with oval lance-shaped, crenate-serrate leaves with parallel veins. Flowers in early summer, greenish, diœcious: female ones with 4-cleft stigmas. The variety *grandifolius* is an improved form.

Culture &c. as above.

R. californicus (*R. oleifolius*).—An unarmed evergreen Californian shrub 6–12 ft. high, with leathery, elliptic oblong, entire leaves 2 in. long. Flowers in May, greenish, with 5 stamens.

Culture &c. as above. Ripens seeds freely.

R. catharticus (*Common Buckthorn*). A British shrub 5–10 ft. high, with ovate, acutely serrated leaves. Flowers from May to July, greenish. Fruit black, ¼ in. in diameter.

Culture &c. as above. Ripens seeds freely.

R. croceus.—A spiny, evergreen shrub 4 ft. high, native of California. Leaves leathery, roundish obovate, about ½ in. long, of a bright yellowish-brown beneath when dry. Flowers in May, greenish, with 5 stamens; petals absent. Fruit greenish or yellowish.

Culture &c. as above. This species is rarely seen.

R. davuricus (*R. utilis*).—A spiny Chinese shrub, 15–20 ft. high, with obovate pointed or narrowly elliptic lance-shaped leaves in clusters at the ends of the branchlets. Flowers in May, greenish-yellow.

Culture &c. as above.

R. Frangula (*Berry-bearing Alder; Black Dogwood*).—A British shrub 5–10 ft. high, with obovate entire leaves, and awl-shaped stipules. Flowers in early summer, greenish-white, followed by black fruits ¼ in. in diameter. The wood is used for gunpowder. There are several varieties of this species, among which may be noted *asplenifolius*, *aureo-variegatus*, *angustifolius*, and *latifolius*.

Culture &c. as above. Ripens seeds freely.

R. latifolius.—A shrub about 5 ft. high, native of the Azores. Leaves elliptic, pointed, entire, with 12–15 nerves. Flowers in July, greenish, hermaphrodite; stigma slightly 3-cleft.

Culture &c. as above.

R. libanoticus.—An unarmed shrub 6 ft. high, native of Asia Minor, with whitish bark. Leaves shortly stalked, ovate, or oblong blunt, rounded at the base, finely toothed on the edge, becoming bronzy purple in autumn. Flowers in May, yellowish.

Culture &c. as above. Ripens seeds freely.

R. robustus.—A vigorous tree about 20 ft. high, with dark green, leathery leaves 7–8 in. long, over 3 in. broad, broadly ovate lance-shaped. Flowers in May, green, succeeded by black, globose fruits, ½ in. in diameter.

Culture &c. as above.

CEANOTHUS.—A genus of about 30 species of evergreen smooth or downy shrubs, with alternate, rarely opposite, stalked, leathery, entire leaves. Stipules minute, caducous. Flowers hermaphrodite, small, numerous, in terminal cymose clusters or panicles. Calyx-tube turbinate or hemispherical, 5-cleft. Petals 5, inserted beneath the thickened disc and narrowed into a stalk or claw at the base, the broader apical portion being hooded. Stamens 5, longer than the petals. Fruit a 3-lobed drupe.

Culture and Propagation. — These ornamental plants thrive in a light, rich, well-drained soil, and do well in almost any position. They are chiefly suitable for walls, where they flower profusely, but some kinds such as *C. americanus* and *C. asureus* make beautiful bushes in warm and open situations, sheltered from the north and east winds. The spring or early summer flowering varieties should be pruned after the period of blooming is over, leaving 2 or 3 eyes of the previous year's growth to produce the flowering trusses for the following year. The later flowering kinds may be pruned in a similar way, or early in the year before growth begins.

They may be readily increased by layers; or from seeds sown in autumn in a cold frame in sandy soil. Cuttings of the ripened shoots will also root freely in sandy soil under handlights in late summer and autumn.

C. americanus (*New Jersey Tea*).—A N. American shrub about 4 ft. high, with ovate pointed, serrated leaves 2–3 in. long, downy beneath and distinctly 3-nerved. Flowers from June to September, white, in long axillary clusters near the ends of the shoots.

Culture &c. as above. This species may be grown either on a wall or as a bush according to the mildness or otherwise of the locality. The popular name is probably due to the fact that its leaves were brewed into tea during the civil war by the American soldiers.

C. azureus (*C. bicolor; C. cæruleus*).—A pretty Mexican shrub 3–5 ft. high, with blunt ovate-oblong, acutely serrated leaves, smooth above, downy beneath. Flowers in April and May, pale blue, borne in long dense racemes. *Gloire de Versailles*, *Arnoldi*, *Bertirii*, *Lucie Moser*, *Theodor Frœbel*, *President Reveil*, *Virginal*, *Sceptre d'Azur*, *Ceres*, *Carmen* &c. are fine varieties raised by crossing *C. asureus* and *C. americanus*. The hybrids are far superior to their parents and there is a greater range of colouring in their flower trusses, varying from blue to white and pale rose. The flowering period of many of them also extends from June to September, some being earlier or later than others.

Culture &c. as above.

C. collinus.—A North American species about 1 ft. high, with ovate or elliptic, somewhat clammy leaves, and trusses of white flowers in summer.

Culture &c. as above. Rarely seen.

C. cuneatus (*C. verrucosus*).—A Californian shrub 4 ft. high, with wedge-shaped, obovate or oblong usually entire leaves, which are opposite, instead of alternate, as in most of the species. Flowers in April, pale blue, sometimes white.

Culture &c. as above.

C. dentatus (*C. Lobbianus*). — A pretty evergreen 4–6 ft. high, native of California. Leaves clustered, obovate or oblong elliptic, acute, waved on the edges. Flowers in early summer, blue.

Culture &c. as above.

C. divaricatus.—A dense-growing N. American shrub 8–10 ft. high, with spinose straggling branches, and oblong ovate leaves, rounded at the base, blunt or acute at the apex, and with a very glossy green surface. Flowers in May and June, nearly white or very pale blue.

Culture &c. as above. This species requires wall protection.

C. floribundus.—A Californian shrub with small, oblong acute, serrulate, shining green leaves. Flowers in June, brilliant blue, crowded in globular heads.

Culture &c. as above, p. 305.

C. integerrimus.—A shrub 3–6 ft. high, native of California. Leaves ovate-oblong entire or slightly glandular, with entire not toothed edges. Flowers in June, usually white, sometimes tinted with blue, and borne in large panicles at the ends of the shoots.

Culture &c. as above. Best grown on a wall.

C. microphyllus.—A somewhat decumbent N. American species 2 ft. high, with small, oblong, blunt, entire leaves. Flowers in May and June, white.

Culture &c. as above. Rarely seen.

C. ovatus (*C. ovalis*).—A native of Eastern N. America, closely related to *C. americanus.* It has narrow oval leaves 1–2 in. long, smooth above, and toothed on the margins. Flowers from June to September, white.

Culture &c. as above, p. 305.

C. papillosus.—A hairy Californian shrub 6–10 ft. high. Leaves narrowly oblong, serrulate with numerous wart-like excrescences on the dark green shining upper surface. Flowers in May and June, blue, in dense clusters.

Culture &c. as above. Best on a wall.

C. rigidus.—Native of California 5–8 ft. high. Leaves broadly wedge-shaped or obovate, often emarginate, slightly toothed and, like *C. cuneatus*, opposite instead of alternate, on the woolly or downy branches. Flowers in April and May, deep purple, in long terminal spikes.

Culture &c. as above. Best on a wall.

C. thyrsiflorus (*C. elegans*).—An elegant species, native of California, where it is said to grow into a fine tree about 25 ft. high. The distinctly angled branches are clothed with smooth glossy green toothed leaves 1–2 in. long, and the brilliant blue flowers are borne in dense clusters from June to September.

Culture &c. as above. This species requires the protection of a wall, although it may succeed as a bush or small tree in the open in the mildest parts of the south and west.

C. veitchianus.—A fine Californian shrub, with thick, small, oblong-obovate glandular serrulate leaves with a smooth and shining upper surface. Flowers in early summer, rich deep blue, in dense clusters at the ends of the leafy branches.

Culture &c. as above. Best on a wall.

C. velutinus.—A pretty Californian species having large ovate leaves, deep green above, whitish beneath. The whitish flowers are borne in dense clusters during the summer months.

Culture &c. as above. This seems to be more tender than any of the other species described above. It must therefore be protected by a warm wall, and may prove quite hardy in the south and west in the most favoured localities.

COLLETIA.—A genus of curious and remarkable shrubs often without leaves, and having spreading opposite and 2-ranked branches with spiny shoots. Leaves when present very small, entire, opposite. Flowers clustered or solitary beneath the spines. Calyx membranous bell-shaped or tubular with a 4–5-cleft limb. Petals none, or 4–6 inserted at the mouth of the calyx. Stamens 4–6, inserted with the petals. Fruit a drupe or capsule.

C. cruciata (*C. bictoniensis*).—A very remarkable looking shrub 4–10 ft. high, native of Uruguay, having the stems furnished with pairs of flat triangular woody spines, often 1½ in. across at the base, each pair of spines being usually at right angles to the next pair, thus giving a cross-like arrangement. As a rule the small ovate toothed leaves appear only on the young branches. The small creamy or yellowish-white flowers (which have no petals) appear in autumn, either singly or in clusters, on the under side of the flat spines, and attract attention when in great abundance. There are various forms of this ferocious looking shrub known, and they were at one time regarded as distinct species. The best known perhaps is *C. spinosa* (or *C. horrida*), which may be recognised by having long slender stiff and sharply pointed spines over 1 in. long, and only slightly flattened. Occasionally both forms—*C. cruciata* with broad flattish spines, and *C. spinosa* with long slender spines—are found on the same plant. Other variations have been recognised and are represented by such names as *armata*, *ferox*, *polyacantha*, *spinosissima*, and *valdiviana*, but they have all originated from the same species.

Culture and Propagation.—Although when first introduced to cultivation *C. cruciata* was grown in hothouses, it has since proved to be practically hardy in ordinary winters in the neighbourhood of London, and has not been injured by 10° of frost. It is, however, wise to grow it in sunny sheltered situations, and in good well-drained garden soil. The plants may be increased by inserting cuttings of the more or less ripened shoots in sandy soil under a handlight or on a gentle hotbed.

DISCARIA. — A genus containing about a dozen species of much-branched shrubs closely related to the Colletias, having often spiny branches, small opposite leathery leaves in the axils of which the small flowers are produced. Calyx more or less tubular or bell-shaped, with 4–5 recurved lobes. Petals none, or 4–5, hooded, and inserted in the mouth of the calyx. Stamens 4–5, inserted with the petals. Fruit a dry leathery 3-lobed drupe or capsule.

D. serratifolia (*Colletia serratifolia*). A graceful Chilian shrub 10–12 ft. high, having long slender drooping shoots, clothed with dark green and very glossy ovate-oblong serrate leaves ½–1 in. long, and furnished with a pair of stiffish slender spines at each joint. The small greenish-white flowers are sweetly fragrant, and produced in dense clusters during June and July, giving the plants an attractive appearance.

This is the best known and most ornamental species in cultivation, but to it may be added *D. longispina* (also known as *Colletia longispina*) from Uruguay. This has rather longer spines than *D. serratifolia*, and masses of small yellowish-white blossoms. *D. Toumatou* is another species from New Zealand. It grows 2–6 ft. high, having the stems armed with sharp spines 1–2 in. long, and clusters of small white flowers.

Culture and Propagation.—The Discarias require to be grown in warm sheltered situations, and will flourish under the same conditions as the Colletias. Ordinary good and well-drained garden soil suits them well, and new plants may be obtained by means of cuttings of the more or less ripened shoots inserted in sandy soil under a handlight or in a hotbed.

XXXIV. AMPELIDEÆ—Vine Order

An order containing about 250 species of evergreen or deciduous climbing shrubs often with copious watery juice, and tendrils. Stems knotted or jointed, roundish, angled, or compressed. Leaves alternate, stalked, simple or digitately 3–5-foliolate, or pedate. Flowers regular, hermaphrodite or unisexual, small, in cymes or panicles, opposite the leaves, rarely axillary. Calyx small, entire, or 4–5-toothed or lobed. Petals 4–5, free or variously united. Stamens 4–5, opposite the petals. Style short, conical, awl-shaped or none; stigma capitate or disc-like, somewhat lobed. Fruit a berry, often watery as in the well-known Grape.

VITIS (including Ampelopsis).—A genus with about 230 species having the botanical characters as described for the order above.

Culture and Propagation.—The Vines are all beautiful climbing shrubs, the foliage of which gives wonderful autumn tints, and may be utilised in a variety of ways—for covering naked walls, on trellises, over boulders of rock-work, up poles, over arbours &c. They thrive in deep, rich, loamy soil, and being gross feeders should have the soil well manured or mulched every year in late autumn or during the winter months.

Vines are perhaps most graceful when grown in parts of the garden where they may spread forth their graceful and leafy branches at will. It is, however, more or less necessary according to circumstances as regards space, or the vigour of any particular variety, that the plants should be pruned or thinned out occasionally. This operation is best done at the beginning of the year while the buds are still dormant, cutting back the shoots almost close to the main stem, so as to leave one or two buds to develop branches wherever required.

They may be increased by cuttings of the ripened wood inserted in pots in a close frame in January and February, or many of them—like the Virginian Creeper (*Vitis quinquefolia*) will root readily out of doors if cuttings about 4 in. long are inserted in the autumn in a shady border. Each joint containing a good plump and well-ripened bud will make a new plant if inserted in gentle heat in the early part of the year. When the cuttings are well rooted they may be potted up singly into small pots, and kept in a close warm frame or greenhouse for some time until well established. Frequent sprinklings overhead with tepid water will be very beneficial, as the young plants do not like a dry atmosphere.

V. **aconitifolia** (*Ampelopsis triloba; A. lucida; A. tripartita; V. dissecta*).—A slender, elegant and free-growing Chinese species, with long reddish branches, and leaves deeply cut and lobed like those of the Monkshood. There are two or three forms in cultivation.

Culture &c. as above.

V. **acuminata.**—A native of Eastern Asia having narrow ovate entire leaves rounded or slightly heart-shaped at the base, gradually tapering to a sharp point and scarcely toothed on the edges. The upper surface is quite smooth, but the under one is covered with a glaucous white down. In autumn the plants are rendered ornamental by the long narrow bunches of large black Grapes.

Culture &c. as above.

V. **æstivalis** (*American Summer Grape*).—A North American climber 20 ft. long, with simple, rounded, heart-shaped leaves, often variously lobed, woolly beneath, rather smooth when old. Flowers in May and June, scented like Mignonette. Fruit black with a bloom, pleasant-tasting, ripe in October, and resembling the fruits of the Black Currant in appearance.

Culture &c. as above.

V. **amurensis.**—A vigorous grower native of N. China, with the young stems and leaf stalks tinged with purple, but not particularly coloured in autumn.

Culture &c. as above.

V. **arborea.**—A beautiful N. American species distinguished by its twice pinnate leaves, the numerous leaflets being small and deeply toothed. It is of shorter and more bushy growth than the other species. Flowers in June, green, small, succeeded by globose berries. This species is also known as *V. bipinnata.*

Culture &c. as above.

V. **arizonica.**—A native of Arizona, with a beautiful habit and very small leaves. It looks well grown as a bush or over a short stump.

Culture &c. as above.

V. **Berlandieri** (*V. monticola*).—This hardy Vine is a native of Texas and New Mexico, and is remarkable for having 5-angled stems covered with a crispy and flaky down. The roundish heart-shaped leaves are more or less 3-lobed and toothed, and in autumn clusters of blackish-violet berries are borne.

Culture &c. as above.

V. **californica.**—A beautiful Californian Vine remarkable for the deep crimson colouring of its roundish downy leaves in autumn. It is a vigorous grower, and becomes more highly coloured in hot dry seasons. It likes plenty of moisture at the root in summer and repays for being grown in deep rich soil.

Culture &c. as above.

V. **capreolata.**—A native of the Temperate Himalayas, with 5-foliolate leaves; leaflets more or less ovate-lance-shaped, acute, 2–3 in. long. Fruit black, globose, about the size of a Currant.

Culture &c. as above. This species may not be quite hardy in northern parts. It is best on a south wall.

V. **Coignetiæ.**—A beautiful Japanese Vine, with large, heart-shaped, irregularly toothed leaves 6–10 in. across, turning a glorious crimson in autumn and having the under surface more or less densely covered with a reddish woolly down.

Culture &c. as above. It is fairly easily raised from imported seeds, but some little difficulty has been experienced in obtaining plants in the usual way from cuttings, although it grafts readily on several of the American species.

V. cordifolia (*Chicken, Frost,* or *Winter Grape*).—A vigorous N. American climber 12 ft. long, with thin, 3-lobed, heart-shaped leaves, 3–6 in. wide, sharply and coarsely toothed. Flowers in early summer, sweet-scented. Berries blue or black, with a 'bloom,' sharp-tasting, ripening after frost. *Riparia* is a form with broader cut-lobed leaves; and *palmata* is a sub-variety with the leaf stalks and branches frequently red in colour.

Culture &c. as above, p. 307.

V. davidiana (*Cissus davidiana; C. platanifolia; C. rubricaulis; Spinovitis Davidi*).—A vigorous Chinese climber with broadly 5-lobed sharply toothed leaves on long red stalks. Fruits violet in colour, not eatable. This species is closely related to *V. Romaneti* and varies a good deal in character if the plants are raised from seeds.

Culture &c. as above, p. 307.

V. ficifolia.—A distinct species, native of China and Japan, and remarkable chiefly for its small roundish lobed leaves somewhat like those of the Common Fig.

Culture &c. as above, p. 307.

V. heterophylla humulifolia (*Hop-leaved Vine*).—A splendid Chinese and Japanese climber with 3–5-lobed, sharply serrate leaves, dark green and wrinkled above, pale beneath with downy veins, on slender red stalks. One of the features of this plant is its beautiful turquoise-blue berries produced in great abundance, and speckled with black. The variegated form is very desirable, the leaves being beautifully marbled with white or pale rose on a greenish ground.

Culture &c. as above. A warm sunny situation suits these plants best.

V. inconstans (*Ampelopsis Veitchi; A. tricuspidata*).—One of the most beautiful and useful of Vines, best known in gardens under its synonyms. The name here adopted is, however, descriptive of the varying and inconstant shape of the leaves, which from being almost entire in a young state change to roundish heart-shaped with 3 wedge-shaped tailed lobes and coarsely toothed edges in the older and larger ones. In some of the best forms the leaves assume in autumn beautiful shades of purplish-red and crimson, while others are of a mellow brown. It is a native of Japan.

Culture and Propagation.—This plant grows freely in good soil, and in a year or two will completely cover a wall or the end or sides of a house, the slender, wiry branches clinging to the stones or bricks by means of numerous suckered tendrils.

It may be easily increased from cuttings of the ripe wood cut to a single 'eye' or joint, and inserted in light sandy soil in gentle bottom heat any time from January to the middle of March.

V. japonica (*Cissus japonica*).—A vigorous Japanese species having leaves divided into 5 stalked roundish oval, toothed or pointed leaflets. There is a variety called *marmorata* with broad yellow blotches on the leaves, and another named *crassifolia* which has large and thick leathery 3-lobed leaves, the upper surface of which is bright shining green, and the under surface is covered with a cobwebby down.

Culture &c. as above. This species is somewhat tender except in the mildest parts.

V. Labrusca (*American Plum Grape; Isabella Grape; Northern Fox Grape*).—A very attractive North American species with large, roundish heart-shaped, variously lobed leaves, rusty woolly beneath. The flowers are scented like Mignonette, followed by large dark purple or amber-coloured berries, with a tough, musky pulp, ripe in September or October.

Culture &c. as above.

V. lanata.—A beautiful Himalayan species with heart-shaped, ovate, shortly pointed leaves 3–6 in. long, 2–3 in. broad, softly downy, occasionally woolly beneath or nearly glabrous, assuming a beautiful scarlet colour in autumn. The green flowers in May are succeeded by round, purple fruits in autumn.

Culture &c. as above.

V. quinquefolia (*Ampelopsis hederacea; A. quinquefolia*).—*Virginian Creeper.*—A well-known N. American climber with palmate leaves cut into 3–5 leaflets, oblong pointed, toothed, assuming in autumn various shades of crimson, scarlet and purple.

A most luxuriant grower, and useful for covering walls, arbours, trellises, old tree trunks, verandahs &c. There are a few varieties, such as *incisa*, with more deeply cut leaves; *hirsuta*, downy on both surfaces; *muralis*, which, unlike the other forms, has the power of attaching itself to walls by means of suckered tendrils, like *V. inconstans.*

Culture &c. as above.

V. reniformis violacea.—A distinct Chinese Vine with long slender stems and large roundish kidney-shaped leaves with crenulate margins, deep green above, paler beneath and strongly veined, the veins and stalks being clothed with cottony hairs. The male and female flowers are borne on separate plants, the male ones being in small panicles on slender deep red stalks.

Culture &c. as above.

V. Romaneti.—A vigorous and distinct Chinese species with large heart-shaped, toothed leaves, the stalks of which, as well as the branches, are covered with stout hairs or bristles. The male and female flowers are borne on separate plants in compact clusters.

Culture &c. as above.

V. serianiæfolia (*Ampelopsis serianiæfolia; A. tuberosa; Cissus viticifolia*).—A tuberous-rooted Japanese species, with green palmately 3–5-parted leaves; leaflets obovate acute incised-toothed or somewhat lobed; rachis articulately winged.

Culture &c. as above.

V. striata. — A beautiful evergreen climber, native of S. Brazil and Uruguay, with rather thick, digitate, dark-green leaves; leaflets unstalked, oblanceolate, serrate, wedge-shaped at the base. Fruit reddish, about the size of small peas. It is called the Ivy of Uruguay, where in the woods it is one of the most beautiful climbers, covering the bushes with red berries in winter.

Culture &c. as above. Although from rather warm regions, this species is hardy in warm sheltered places in the neighbourhood of London.

V. Thunbergi. — A vigorous grower with large leaves 9 in. across, slightly lobed and coarsely toothed, like those of *V. Coignetiæ.* covered with a rusty down beneath. Stems and leaf stalks purplish.

Culture &c. as above.

V. vinifera (*Common Grape Vine*).—This native of S. Europe is well known, both as a hardy climber, and as the parent of the varieties grown in hothouses for their luscious fruits. Leaves lobed, sinuately toothed, smooth or downy. Fruit purple, greenish-white or green, watery or fleshy, sweet, musky or sour to the taste. There are several distinct varieties, among which may be mentioned *purpurea,* with purple foliage in autumn; *laciniosa* or *apiifolia* is the Parsley-leaved Vine with leaves deeply cut into several deeply lobed leaflets. The *Miller's Grape* has small leaves covered with white down, as if slightly dusted with flour; and the *Teinturier* Grape has beautiful, claret-coloured leaves in autumn. *Amurensis* is a variety with entire 3–5-lobed leaves, woolly on both sides when young.

Culture &c. as above. The cultivation of the Grape Vine for fruit is dealt with at p. 1097.

V. vulpina (*Southern Fox Grape; Bullace; Muscadine*).—A distinct and handsome N. American species, with rounded, usually smooth and shiny green leaves, coarsely toothed, rarely lobed, 2–3 in. across. Fruits purplish, without bloom, musky flavoured, about ¾ in. in diameter, ripe early in autumn. The bark of this species does not peel off like others, and the branchlets are minutely warty.

Culture &c. as above.

XXXV. SAPINDACEÆ—Horse Chestnut Order

A very large order (600 or 700 species) of trees, shrubs or undershrubs, rarely herbs, with alternate or opposite, simple or compound leaves, often evergreen, and regular or irregular, usually polygamous-diœcious flowers. Sepals 4–5, very rarely none or more, free, or united, often unequal. Petals none, or 3–5, very rarely more, equal or unequal, the upper one sometimes smaller or deficient. Stamens 8, rarely 5–10 (very rarely 2, 4, or 12 or more), very often hypogynous and inserted in the disc. Fruit capsular, indehiscent, drupe-like, berry-like, or leathery, entire or lobed, or composed of 2 or 3 samaras.

KŒLREUTERIA.—The characters of this genus are described below under *K. paniculata,* which until recently was the only species known.

K. bipinnata.—A recently introduced Chinese tree with twice pinnate leaves 2 ft. or more long and nearly as broad, each of the pinnæ having 9–10 ovate acute toothed leaflets. The bright yellow flowers with a purple blotch at the base of the petals are like those of *K. paniculata*, and are borne in summer in large panicles. The broadly elliptic fruits about 2½ in. long are purple when ripe.

Culture &c. as for *K. paniculata.*

K. paniculata. — A handsome tree, 10–15 ft. high, native of N. China, with alternate, deciduous, oddly pinnate leaves, composed of 7–9 pairs of deeply toothed leaflets, rich yellow in autumn or varying to bronze and purple. Flowers in summer, irregular, polygamous, yellow, in large terminal panicles about 2–3 ft. long. Calyx 5-parted, equal, with valvate sepals. Petals 3–4, clawed, with 2 scales at the base, the seat of the fifth petal vacant. Stamens 5–8, bent down, with free hairy filaments. Fruit a large vesicular, inflated, 3-lobed capsule, very conspicuous in autumn, but only produced in quantities during hot and favourable seasons.

Culture and Propagation. — This is an excellent plant for groups, and will thrive in any good soil, in a warm, sheltered position. It may be increased by cuttings of the young wood in spring, inserted in light sandy soil under handlights or bell-glasses in gentle heat, or by layers in early autumn.

ÆSCULUS (including Pavia) (HORSE CHESTNUT; BUCK EYE).—A genus of about 14 species of beautiful flowering, deciduous trees, with opposite, exstipulate, digitate leaves, composed of 5–9 serrated leaflets. Flowers polygamous, irregular. Calyx bell-shaped or tubular, 5-cleft, with unequal, imbricate lobes. Petals 4–5, unequal, clawed. Stamens 5–8, free, inserted in the disc. Fruit a leathery capsule, smooth or prickly, 3-lobed, or almost globose. Seeds large, like those of the Sweet Chestnut in appearance. The genus *Pavia*, which is included here, is chiefly distinguished by having no prickles on the fruits.

Culture and Propagation. — The Horse Chestnut and Buck Eyes are noble ornamental trees, which thrive in almost any soil, but preferably loam. The seeds germinate freely, but some of the rarer kinds are grafted or budded on stocks of the common Horse Chestnut (*Æ. Hippocastanum*).

As solitary specimens in parks and large gardens, or as planted in avenues, the Horse Chestnuts must be regarded as some of the finest sights on the landscape. They not only flower profusely, but they cast a deep and refreshing shade during the hot summer days. The specimens in Bushey Park near Hampton Court are famous for their beauty, and thousands go purposely to see them in blossom every year. Along the banks of the Thames from Kew to Richmond and also in Kew Gardens there are many noble specimens.

Æ. californica.—A handsome Californian tree, often 40 ft. high in its native habitat, but much smaller in this country. Leaves with smooth oblong-lanceolate, serrulate leaflets. Flowers in May, white or pale rose, highly fragrant, borne in great profusion.

Culture &c. as above.

Æ. carnea (*Æ. rubicunda; Æ. coccinea*).– A distinct and beautiful North American tree 20 ft. high, with 5–7 obovate-wedge-shaped, serrated leaflets composing the leaves. Flowers in June, scarlet, in terminal clusters; petals 4; stamens 8.

Culture &c. as above.

Æ. chinensis.—An ornamental tree, native of the mountains near Pekin. Its large palmate leaves are composed of oblanceolate acute leaflets 6–8 in. long, with serrate or crenate margins, while the leaf stalks and also the flower stalks are covered with fine hairs. The creamy white flowers are borne in pyramidal clusters somewhat later in the season than those of the common Horse Chestnut, but are not so large or striking in appearance as in that species.

Culture &c. as above.

Æ. flava (*Æ. neglecta*).—*Sweet Buck Eye.*—A beautiful N. American tree 20–25 ft. high, with leaves on downy stalks, and composed of 5–7 elliptic oblong leaflets, downy beneath. Flowers in May, pale yellow, with a tubular, 4-petalled corolla. Country lads are fond of sucking the nectar from the flowers of this species. The variety ***purpurascens*** (also known as ***Pavia discolor; P. hybrida;*** and ***Æ. discolor***) has yellow flowers, tinged with red or purple.

Culture &c. as above.

Æ. glabra (*Æ. ohioensis; Æ. pallida*). A North American species, 20 ft. high, with very smooth leaves cut into 5 leaflets. Flowers in June, greenish-yellow; corolla with 4 spreading, clawed petals, shorter than the stamens.

Culture &c. as above.

Æ. Hippocastanum (*Common Horse Chestnut*).—This huge, well-known tree from the mountainous regions of S. Eastern Europe is probably the noblest looking flowering tree in the British Islands. Its leaves are divided into 7–8 obovate-wedge-shaped, acute, coarsely toothed leaflets 6–9 in. long. According to locality the beautiful white flowers tinged and speckled with red are produced in more or less erect pyramidal racemes, about 1 ft. long, from Easter to Whitsuntide, from the end of almost every branch. There are a few varieties known. One *flore pleno* has double or semi-double flowers; *foliis aureis variegatis* has the leaves blotched with yellow; and *laciniata* has the leaves more or less finely cut and lobed.

On the Continent the seeds of the Horse Chestnut are used as food for cattle, sheep, pigs and poultry, and are said to improve the quantity and flavour of milk in cows.

Culture &c. as above. Easily raised from seeds sown in autumn. Owing to the shade of this tree, and the horizontal spreading of its branches, little else will grow beneath it except Ivy.

Æ. indica.—A handsome tree native of N. India, with very large smooth leaves, having 7–9 lance-shaped, serrate, stalked leaflets. Flowers in May in terminal clusters; lower petals white tinged with red, upper ones yellow and edged with white.

Culture &c. as above.

Æ. parviflora (*Æ. macrostachya; Pavia macrostachya*).—A dwarf North American tree 8–9 ft. high, with leaves composed of 5–7 oval-obovate leaflets, woolly beneath. Flowers from April to July, white, in long racemes. Stamens 6–7, three times longer than the corolla.

Culture &c. as above.

Æ. Pavia (*Pavia rubra*).—*Red Buckeye.*—A N. American tree 10–15 ft. high, with leaves composed of 5 elliptic oblong acute leaflets, slightly bearded in the axils of the nerves beneath. Flowers in May, bright red, in large loose clusters. The variety *humilis* grows only about 6 ft. high; *laciniata* has deeply cut leaflets; *pendula* has drooping branches; *atrosanguinea* and *Whitleyana* have more brilliant flowers than the type.

Culture &c. as above.

UNGNADIA.—A genus represented only by the following species:—

U. speciosa.—An ornamental shrub or small tree, native of Texas, having alternate oddly pinnate leaves composed of 3–7 pairs of serrate ovate lance-shaped leaflets. The irregular polygamous flowers appear in summer in lateral clusters and are of a pleasing pinky shade. The bell-shaped calyx is 4–5-parted, and the 4–5 nearly equal petals have the claws united and crested at the apex. Stamens 7–10. Capsule 3-lobed, leathery.

Culture and Propagation.—This tree, although fairly hardy in the neighbourhood of London, is more suitable for the milder and warmer parts of the south and west. It will thrive in ordinary good garden soil like the Horse Chestnuts, and may be increased by layering the branches, or by sowing imported seeds in cold frames or greenhouses immediately upon arrival. It would also probably graft on stocks of the Common Horse Chestnut.

XANTHOCERAS.—A genus containing only one species described herewith and including the characters of the genus.

X. sorbifolia. — A beautiful Chinese tree 5–15 ft. high, with somewhat downy branches, and alternate, exstipulate, oddly pinnate leaves, having serrated leaflets, resembling the 'Mountain Ash' or 'Rowan tree' (*Pyrus Aucuparia*, p. 405). Flowers in June, white, over 1 in. across, with blood-red streaks at the base, regular, polygamous, produced in erect racemes 6–8 in. long. Sepals 5, equal, boat-shaped, imbricate. Petals 5, elongated, clawed, without scales. Disc cup-like, slender, with 5 horns alternate with the petals. Stamens 8. Fruit a 3-celled, oblong obtuse capsule, as large as a hen's egg.

Culture and Propagation.—This tree thrives in good light garden soil. It is hardy in the neighbourhood of London, but attains a greater size when grown on a south wall than if grown as a bush in the open. In the south of England and Ireland it flourishes and makes a charming flowering tree. In hot favourable seasons it ripens seeds freely, the large leathery capsules opening when ripe much in the same way as those of the Horse Chestnut. It is usually increased by sowing seeds as soon as ripe in cold frames, but cuttings of the roots sometimes 'strike' if inserted in light sandy soil in gentle heat in autumn or early spring.

ACER (MAPLE).—A genus of about 50 species of beautiful trees and shrubs, containing a watery or sugary juice, many of them remarkable for the colours of the foliage. Leaves opposite, deciduous, palmately 3–7-lobed or parted, rarely entire. Flowers usually polygamous-diœcious, regular. Calyx 4–12-, often 5-parted. Petals equal in number to the sepals, or none. Disc ringed, fleshy, lobed. Stamens 4–12, often 8. Fruit of 2 spreading samaras with long wings or 'keys.'

The genus NEGUNDO, although retained as distinct by the authors of the 'Genera Plantarum,' is now usually merged with Acer, from which it would be scarcely possible to distinguish it except by means of its flowers. The following are the chief characteristics of the Negundos: flowers diœcious, calyx minute, 4–5-cleft or parted. Petals none. Disc obsolete. Stamens 4–6, hypogynous. Fruit like that of the Maples.

Culture and Propagation.—Most of the Maples thrive in deep, loamy, well-drained soil. The Japanese varieties have of late years become very popular, not only for the outdoor garden, but also as pot plants for the conservatory. They require a somewhat sheltered position outside, and are nearly all quite hardy.

Most Maples are easily raised from seeds sown in autumn or spring. Layering and grafting are employed for rare or choice varieties, and many are also budded during the summer. On the whole it is more satisfactory for the amateur to obtain established plants from a nurseryman.

A. argutum.—An elegant Japanese species having 5-lobed leaves, the lobes being rather sharply tapering to a point, and having more or less doubly serrate margins.

Culture &c. as above.

A. campestre (*Common Maple*).—A small British tree with rough bark full of fissures, having kidney-shaped, 5-lobed leaves. This species is chiefly met with in hedges in the southern counties. The variety *austriacum* has the lobes of the leaves somewhat pointed; those of *collinum* (a French variety) being blunt; *hebecarpum* has downy fruits; *lævigatum*, smooth and shining leaves; *nanum*, very dwarf; *tauricum* has larger and less lobed leaves than the type; and *variegatum* has leaves beautifully variegated with blotches and stripes of white and pale yellow. *Postelense* is a new form with yellowish leaves.

Culture &c. as above.

A. carpinifolium.—A very distinct and interesting Japanese species which attains a height of about 50 ft. in its native country. It is remarkable for having leaves quite unlike those of other Acers in shape. They are broadly oblong lance-shaped, 4–6 in. long, with coarsely toothed and serrated margins, and resemble those of the Hornbeam. The veins run obliquely from the midrib to the margin in parallel lines, and were it not for the fruits, this species might easily be mistaken as belonging to another genus.

Culture &c. as above.

A. caudatum (*A. lævigatum*).—A distinct species from N. India, where it grows into a fairly large tree. The stems have dark brown bark, and the long slender purplish-red twigs are furnished with moderate-sized leaves, each of which is divided into 3 ovate and much-tapered lobes with coarsely toothed margins.

Culture &c. as above. Although a native of India it seems to be quite hardy in most parts of England and Ireland, though the young growths may be injured in the colder parts of Scotland in severe winters. It is readily increased by layers.

A. circinatum.—A beautiful shrub, 5–6 ft. high, native of N.W. America, having drooping branches and 7–9-lobed serrulated leaves which assume a bright scarlet colour in autumn. Flowers in April, deep red, umbellate.

Culture &c. as above.

A. cissifolium (*Negundo cissifolium*). An elegant Japanese species 5–10 ft. high, with small, light green leaves divided into 3 leaflets.

Culture &c. as above.

A. creticum.—An almost evergreen species 4 ft. high, from the Levant. Leaves wedge-shaped at the base, sharply 3-lobed at the top.

Culture &c. as above.

A. dasycarpum (*A. eriocarpum; A. tomentosum; A. glaucum; A. virginianum*).—A N. American tree 40 ft. high. Leaves truncate at the base, 5-lobed, lobes unequally and deeply toothed, and of a beautiful silvery white beneath, and sometimes measuring 8 in. long without the stalk, by 10 in. broad.

Concerning this species Mr. Nicholson, of Kew, says, 'it is a fast-growing tree of the first rank for ornamental purposes, its graceful habit and handsome foliage causing it to be extensively planted as an avenue and general shade tree both in its native country and in Europe. The flowers which clothe the leafless branches in early spring somewhat resemble those of *A. rubrum*, but are not nearly so highly coloured as are those of that species; they expand too a fortnight or more earlier. In autumn the decaying foliage assumes a bright lemon-yellow tint, at any rate as far as I have observed in this country. Seeds are freely produced and ripened both in England and on the Continent, and a crowd of sports and seedling forms have received names in nurseries.'

Some of the most distinct forms are *aureo-variegatum*, the leaves of which are mottled with yellow; *laciniatum*, with the leaf-lobes more deeply cut and divided than in the type; *lutescens*, having yellowish tinted foliage; and *pulverulentum*, the leaves of which are spotted with white, and the tips of the young shoots are tinted with red.

Culture &c. as above, p. 313.

A. diabolicum (*A. pulchrum*). — An elegant Japanese Maple, remarkable for its large 5-lobed leaves, often measuring as much as 10 in. across. The lobes are more or less unequally toothed or shallowly lobed, while the whole margin is very distinctly defined. The large yellowish flowers in due course give place to clusters of beautiful winged fruits between the wings of which are 2 horn-like projections which probably suggested the specific name to the author of the species.

Culture &c. as above, p. 313.

A. distylum. — A distinct Japanese Maple with ovate un-lobed leaves 6–8 in. long, rounded at the base, tapering towards the tips, and having an irregularly toothed margin. The small yellowish flowers are replaced in autumn by clusters of pretty winged seed vessels.

Culture &c. as above, p. 313.

A. glabrum (*A. Douglasi; A. tripartitum*).—A North American tree 15–30 ft. high. Leaves roundish heart-shaped, deeply 3–5-lobed or parted, bi-serrate, light green.

Culture &c. as above, p. 313.

A. Heldreichi.—A distinct and handsome Maple, native of E. Europe, with rather leathery 3–5-lobed leaves, bright shining green above, and rather bluish-green beneath. The leaf-lobes are coarsely and bluntly toothed, and the general appearance reminds one of the foliage of the well-known Virginian Creeper (p. 309).

Culture &c. as above, p. 313.

A. heterophyllum (*A. sempervirens*). An evergreen species about 4 ft. high, native of the Levant, Asia Minor &c. Leaves small, ovate entire, 3-lobed, slightly serrate, smooth.

Culture &c. as above, p. 313.

A. ibericum. — A Caucasian species 20 ft. high, with bluntly 3-lobed leaves; lobes with 1 or 2 teeth, side ones distinctly nerved.

Culture &c. as above, p. 313.

A. insigne. — A pretty Caucasian species, very much resembling the Common Sycamore (*A. Pseudo-Platanus*) in the foliage. There is a form known as *velutinum*, which is distinguished chiefly by the slight velvety down on the under surface of the leaves.

Culture &c. as above. This is said to be one of the hardiest Maples in cultivation.

A. japonicum. — A beautiful species attaining a height of 20 ft. in its native country, Japan. Leaves many-lobed, light green in early spring. Flowers in April, large, deep purple-red. There are many varieties of this species, all worthy of cultivation. The best known are *aureum* with distinct golden foliage; *compactum* with a compact bushy habit; *laciniatum* with pale green deeply cut leaves; and *rufinerve albo-lineatum* with dark green leaves edged and marbled with creamy white.

Culture &c. as above, p. 313.

A. macrophyllum.—A tree 60 ft. high in its wild state in N. California. Leaves digitately 5-lobed, lobes again divided into three.

Culture &c. as above, p. 313.

A. monspessulanum.—A native of S. Europe 10–20 ft. high, with heart-shaped, 3-lobed leaves; lobes almost or quite equal, entire.

Culture &c. as above, p. 313.

A. montanum (*A. spicatum*).—A Canadian tree 18 ft. high, with 3–5-lobed leaves, unequally and coarsely serrated.

Culture &c. as above, p. 313.

A. Negundo (*N. fraxinifolium; Negundo aceroides*).—*Box Elder; Ash-leafed Maple.*—A very ornamental tree, native of N. America, where it grows 40 ft. high. Leaves pinnate, with 3–5 opposite coarsely and deeply toothed leaflets, the odd one at the apex usually 3-lobed.

There are several varieties, the best being *crispum*, with variously cut and curled leaves; *laciniatum*, with foliage still more deeply cut; and *variegatum*, a handsome variegated form better known than any of the others. It is usually budded on the green variety, and grown either as a bush or a standard. When not overplanted to the exclusion of other choice trees the Box Elder and its varieties make very beautiful groups in large gardens, parks &c.

Culture &c. as above, p. 313.

A. nikoënse (*Negundo nikoënse*).—A very distinct hairy Japanese shrub, with 3-foliolate leaves, and large fruits.

Culture &c. as above, p. 313.

A. oblongum (*A. laurifolium*). — A Himalayan tree 20 ft. high, with oblong lance-shaped, pointed, entire leaves.

Culture &c. as above, p. 313.

A. obtusifolium.—A native of Crete, 15 ft. high, with rounded bluntly 3-lobed crenate-serrate leaves.

Culture &c. as above, p. 313.

A. opulifolium (*A. Opalus*).—A native of France 8 ft. high, with heart-shaped, 5-lobed, coarsely toothed leaves, like those of the Guelder Rose (*Viburnum Opulus*). The variety *obtusatum* is larger and stronger, with dark green leaves covered with a white or rusty down beneath.

Culture &c. as above, p. 313.

A. palmatum (*A. polymorphum; A. dissectum; A. septemlobum*).—A handsome Japanese species about 20 ft. high in a wild state. Leaves palmately 5–7-lobed; lobes oblong, pointed, serrated.

This is the type of most of the elegant beautifully coloured varieties in cultivation. Although no hard and fast line can be drawn between the various sections, it has however been found more or less convenient to arrange the various forms of *A. palmatum* under three heads as follows:

1. The PALMATUM GROUP proper.—The plants in this group are recognised by the leaves generally having 5 deeply cut lobes. There are many forms, but the following are among the most ornamental:—*aureum*, a strong-growing form with long-stalked rather large leaves, light green and yellowish when young, but assuming beautiful gold and orange-scarlet tints in autumn; *albo-marginatum*, the green leaves of which are edged with white; *crispum*, a very distinct form with green red-stalked leaves, rolled up at the edges. The habit is also quite distinct, somewhat resembling that of a miniature Lombardy Poplar; *linearilobum*, a form with narrow, slightly toothed or quite entire lobes, cut to very near the base of the leaves, which when young are red, as are also the shoots, but become green with age; there is a sub-form of *linearilobum* called *atropurpureum*, which differs in having deep bronzy purple leaves; *minor* has smaller leaves than the typical *palmatum*, they are at first green but assume a bronzy tint with age; *roseo-marginatum* has green leaves edged with rose; and *Shikara Jama* has finely serrated pale-green foliage suffused with red and blotched with dark olive-green.

2. The SEPTEMLOBUM GROUP.—The plants in this group are distinguished by the leaves being divided into 7–9 overlapping lobes, generally larger than those in the *palmatum* group. Among the many forms in this section may be mentioned:—*atropurpureum*, with bold dark purple foliage; *bicolor*, an attractive form rendered remarkable by the large carmine blotches on the leaf-lobes, one half of which is often of a very brilliant red; *elegans* has narrower and more deeply cut lobes than the typical *septemlobum*, which is a free-growing variety with pretty green leaves. They are of a delicate light green, flushed with red when young, but occasionally tinted with bronze; the sub-variety, *elegans purpureum*, is similar in form but of a much deeper bronzy-purple tint; *flavescens* has the young shoots and leaves more or less of a yellowish tint; *latifolium atropurpureum* has beautiful

bronzy-purple foliage; *lobatum* has broad overlapping irregularly cut lobes; *reticulatum* is recognised by the variegated network of yellow or white upon a light green ground; *sanguineum* (which is loosely known under many other names) has deep red leaves; *tricolor* has reddish leaves prettily streaked and blotched with creamy-white and rose; and *variegatum* comes very near, the young leaves and stalks being red, but streaked with white and rose when old. The green-leaved form of *A. septemlobum* is often used as a stock upon which the other varieties are budded or grafted.

3. The DISSECTUM GROUP.—This group is characterised by the leaves being cut into 7–9 overlapping lobes, each of which is again more or less deeply cut or incised from the margins to the midrib. The plants in this group are extremely graceful and feathery-like in foliage. The following are some of the best varieties:—The typical form has finely cut green leaves; *ornatum* is similar in appearance but the Fern-like leaves are of a beautiful deep red or bronzy-purple; *roseo-marginatum* has deep green leaves, bordered with rose and streaked with rose and white; *sessilifolium* is a very distinct form with deep green finely cut leaves and leaflets; and *tinctum* is almost similar to the typical green-leaved *dissectum*, from which, however, it may be distinguished by the reddish tinge of its beautifully cut foliage.

Culture and Propagation.—From an ornamental point of view, the many beautiful forms of *A. palmatum* quite eclipse all other Maples in cultivation, and of late years they have become immensely popular—so much so indeed that they are now very largely imported direct from Japan. As they do not as a rule grow very quickly and are rarely more than 3–6 ft. high, they are well adapted for growing in pots and in conservatories. Most of them are almost perfectly hardy, except perhaps in the coldest and bleakest parts of the kingdom. In such localities they must, however, be protected if necessary in severe winters by means of mats laced round a wicker work of sticks or canes. As for soil, they seem to flourish equally well in stiff heavy soil, in dryish sandy soil, and in peat. They are therefore suitable for planting in almost any garden the soil of which is in a fairly good and well-drained condition. They should not be mixed up with stronger and more coarse-growing plants in the ordinary shrubbery, as they would thus stand a chance of being sooner or later smothered. To obtain the best effects they may be planted in groups by themselves in warm and sheltered spots, where, however, they will be fully exposed to the ripening influence of the sunshine, so that the brightest tints of the foliage may be highly developed. A mulching of well-rotted manure during the winter months will be of great value in supplying fresh food to the soil, and also for protecting the roots from severe frosts.

A. pectinatum. — A distinct species, native of Nepal and Sikkim, having leaves with 3–5 tapering lobes, the margins of which are remarkable for the fine bristly teeth or serratures. This character readily distinguishes it from *A. caudatum*, with which it has been confused, but the wings of the rose-tinted fruits are also spreading horizontally, instead of being more or less erect as in *A. caudatum.*

Culture &c. as above, and for *A. caudatum.*

A. pennsylvanicum (*A. striatum*).—A beautiful N. American tree 20 ft. high, with trunk striped with white lines. Leaves heart-shaped, 3-lobed, pointed, finely and sharply serrated.

Culture &c. as above, p. 313.

A. pictum.—A native of temperate Asia 15–20 ft. high, with 5–7-lobed, entire, pointed leaves.

The varieties *connivens*, *marmoratum*, *rubrum*, and *variegatum* differ chiefly in the colour tints of the foliage. A new variety named *tricolor* has the young leaves of a bright purple-red hue suffused with rosy-pink, and shading off into irregular masses of deep red or crimson and creamy-white.

Culture &c. as above, p. 313.

A. platanoides (*Norway Maple*). —An ornamental European tree 50 ft. high, with smooth, heart-shaped, 5-lobed leaves; lobes pointed with a few coarse sharp teeth. There are several varieties, such as *aureo-variegatum* with pale yellow, blotched leaves; *laciniatum*, leaves variously and deeply cut, green and yellow; *Schwedleri*, large deep bronzy-red leaves; *variegatum*, with white blotches, and many others such as the Eagle's or Kite's Claw, *cucullatum*, *Lobeli*, *purpureum*, *rubrum*, *columnare* &c.

Culture &c. as above, p. 313.

A. Pseudo-platanus (*Sycamore; Mock Plane Tree*).—An elegant tree 30–60 ft. high, with heart-shaped, 5–7-lobed, unequally toothed leaves. This has been so extensively planted all over the British Islands in all sorts of positions that it appears almost indigenous. It is really a native of Central Europe and W. Asia. Among the several varieties may be mentioned :—*albo-variegatum*, a beautiful form with white and green leaves; *flavo-marginatum*, green and yellow leaves; *longifolium*, leaves more deeply cut and longer stalked than the type; *purpureum*, leaves purple on the under surface. Other varieties worthy of note are *atropurpureum*, *aucubæfolium*, *Leopoldi*, *Prinz Handjery*, *purpureo-variegatum*, and *webbianum*.

Culture &c. as above, p. 313.

A. rubrum (*Scarlet Maple*).—A beautiful Canadian species 20 ft. high. Leaves heart-shaped at the base, palmately 5-lobed, deeply and unequally toothed. Flowers scarlet, handsome, produced in great profusion in spring before the leaves. There are several varieties, one in which the leaves are variegated with white and yellow being very desirable but rather rare. Other forms are *Drummondi* and *sanguineum*, the latter being remarkable for the rich red colouring of the foliage.

Culture &c. as above, p. 313.

A. rufinerve.—A beautiful Japanese tree or shrub, the young branches of which are covered with a bluish-gray 'bloom.' Leaves 3–5-lobed, varying in size and shape, irregularly toothed, smooth above, with reddish hairs on the nerves beneath. The variety *albo-limbatum* is recognised by having as a rule leaves distinctly edged with white.

Culture &c. as above, p. 313.

A. saccharinum (*Bird's Eye* or *Sugar Maple*).—A North American tree 40 ft. high, with smooth, palmately 5-lobed leaves and yellow flowers. The variety *nigrum* has the lobes of the leaves closer together.

Culture &c. as above, p. 313.

A. sieboldianum.—A pretty Japanese Maple closely related to *A. japonicum*, from which it may be distinguished by its yellowish (not purple) flowers, and by its regularly 6-lobed leaves, the lobes of which are regularly serrated on the margins. The leaf stalks and flower stalks are also distinctly hairy.

Culture &c. as above, p. 313.

A. sikkimense.—A pretty Maple, native of the Sikkim Himalayas, where it grows naturally at an elevation of 7,000–9,000 ft. The ovate tapering leaves resemble those of *A. distylum*, but the serration on the edges is scarcely noticeable, and there are 5 main nerves instead of 3, as in *A. distylum*.

Culture &c. as above. This species is rather tender, but will survive ordinary winters in warm sheltered places in the neighbourhood of Kew. In Devonshire and Cornwall and the south of Ireland it would probably be almost perfectly hardy, except in very severe winters, when protection would be required.

A. tataricum (*A. cordifolium*).—A native of S.E. Europe about 20 ft. high, with oblong heart-shaped leaves irregularly toothed or rarely lobed. One of the first to leaf in spring. The form called *Ginnala*, from the banks of the Amur River, is a graceful variety with prettily cut and lobed leaves, having deeply coloured stalks and midribs.

Culture &c. as above, p. 313.

A. Volxemi (*A. Trautvetteri*).—A noble and distinct Caucasian Maple remarkable for its quick and vigorous growth and large 5-lobed leaves, the under surface of which is of a beautiful silvery white.

Culture &c. as above. An excellent tree for making avenues in parks and large gardens.

MELIANTHUS (Honey Flower). A genus consisting of only 4 species of very smooth, glaucous, or hoary shrubs, often strongly scented, with oddly pinnate alternate leaves. Flowers hermaphrodite, usually in terminal or axillary racemes. Calyx swollen at the base, 5-parted. Petals 5, eccentric, one minute or absent, bent down, long-clawed, hairy in the middle. Disc fleshy, one-sided. Stamens 4, hypogynous, inserted in the disc, two long, two short, and bent down somewhat. Style incurved, thread-like, 4-toothed at apex. Capsule papery, 4-lobed, 4-celled.

M. major.—A native of S. Africa 4–6 ft. high, with hollow stems woody at the base. Leaves stem-clasping, smooth, glaucous, with 4–6 pairs of deeply cut leaflets and an odd one at the apex. Flowers in summer, brownish, in long axillary spikes among the upper leaves.

This is the species usually grown, but *comosus*, *minor*, and *pectinatus* are also worth growing outside in summer for subtropical groups on the lawn.

Culture and Propagation. — The Honey Flowers are not, strictly speaking, hardy plants, but they are grown so easily from seeds and look so effective in the garden from early summer to the end of autumn that they are well worth growing. Seeds may be sown in February or March in a little heat. The seedlings may be pricked off separately into small pots when large enough, and will be ready for planting out by June. Larger plants may be obtained by sowing in the autumn and keeping the plants in a greenhouse during the winter. They may also be increased for indoor work by cuttings, which strike freely under a bell-glass. On a well-drained, loamy soil and in sheltered positions the Melianthus may be wintered outside with a slight protection of litter or leaves in the mildest parts of the kingdom.

STAPHYLEA (Bladder Nut).—A genus of 5 species of deciduous branched shrubs, with opposite 3–5-foliolate or pinnate leaves, and white regular hermaphrodite flowers in drooping axillary racemes or panicles. Sepals 5, equal. Petals 5, erect. Stamens 5, equal, inserted at the base of the outside of the rather flat disc. Fruit a bladder-like capsule.

Culture and Propagation. — The Staphyleas thrive in good well-drained ordinary soil, the most popular being *S. colchica*, which is much used in early spring for forcing in greenhouses, when specially treated. For outdoor cultivation the plants may be placed in groups by themselves in warm and sheltered places enjoying a slight shade, and for massing on grass they are very effective. They are increased by suckers and layers, or cuttings of the ripened shoots taken in the autumn and inserted in sandy soil under a bell-glass. Seeds are also freely produced by some of the species such as *colchica*, *pinnata*, and *trifolia*, and from these fresh plants may be obtained. The seeds may be sown in cold frames as soon as ripe, afterwards pricking the seedlings out when large enough. *S. colchica* and *S. pinnata* have been crossed with each other and have produced a hybrid called *S. Coulombieri.*

S. Bolanderi.—A Californian shrub with leaves divided into 3 smooth broadly oval or round leaflets, abruptly acute and serrulate. Sepals and petals about ¼ in. long; style and stamens protruding.

Culture &c. as above.

S. Bumalda.—A Japanese species 6 ft. high. Leaves 3-foliolate, with oblong pointed, roughish leaflets having bristly serratures on the margin. Flowers from June to August; styles hairy, capsule 2-beaked.

Culture &c. as above.

S. colchica. — A distinct Caucasian species 3–5 ft. high, with ternate and pinnately 5-foliolate leaves 4–5 in. long, composed of ovate-oblong pointed serrulate leaflets. Flowers in summer, ¾ in. long, in terminal, erect or slightly nodding racemes.

Culture &c. as above.

S. pinnata (*Job's Tears; St. Anthony's Nuts*).—A native of S. Europe 6–12 ft. high, with leaves composed of 5–7 pairs of oblong smooth, serrated leaflets. Flowers in racemes, succeeded by globose white nuts in a bladdery capsule.

Culture &c. as above.

S. trifolia.—A pretty North American species 6–12 ft. high, with 3-foliolate leaves divided into ovate pointed regularly serrated leaflets, downy when young. Flowers in early summer, with obovate spoon-shaped petals fringed at the base.

Culture &c. as above.

EUSCAPHIS.—A genus containing only 2 species of very smooth shrubs with round branches and opposite, stipulate, oddly pinnate leaves composed of serrate leaflets. The small hermaphrodite flowers are borne in panicles at the ends of the branches. Calyx persistent, 5-cleft. Petals 5, roundish, imbricate. Disc annular, crenate. Stamens 5, with filaments dilated at the base. Fruit consisting of 1–3 follicles.

E. staphyleoides (*E. japonica*). — A rather ornamental shrub 10–12 ft. high, native of China and Japan. It has smooth pinnate leaves, and clusters of small white or yellowish flowers produced at the ends of the branches in early summer. In the autumn the plant is rendered attractive by the red bladdery fruits or follicles.

Culture and Propagation. — This species will flourish in ordinary good garden soil, especially if it consist chiefly of rich loam. A warm sheltered situation suits it best. It may be increased by cuttings of the ripened shoots placed in light soil under a handlight, and also by seeds sown in cold frames as soon as ripe. In Japan it is said this plant is highly valued for its medicinal virtues.

XXXVI. ANACARDIACEÆ—Sumach Order

An order containing 450 species of trees or shrubs with a resinous milky juice. Leaves usually alternate, pinnate, trifoliolate or simple. Flowers hermaphrodite, or polygamous, diœcious, or unisexual, usually regular. Calyx 3–7-cleft or parted. Petals 3–7, rarely absent, usually free, stamens often twice as many as petals, rarely equal in number, or very numerous.

RHUS (SUMACH).—A genus containing 120 species of trees or shrubs abounding in resinous or caustic juice. Leaves alternate, simple, 1–3-foliolate or oddly pinnate, Flowers very small, polygamous, in axillary and terminal panicles. Calyx 4–6-parted; lobes equal imbricate. Petals 4–6, equal spreading. Stamens 4, 5, 6, or 10, free, inserted at the base of the ringed disc. Fruit a small dry compressed drupe.

Culture and Propagation. — The Sumachs are mostly useful for shrubberies, some of them like *Rhus Cotinus* being useful for rough places or under trees. They are excellent for planting in rather dry spots, as they are not so much affected by the absence of moisture as are many other shrubs. They thrive in ordinary garden soil, and are increased chiefly by cuttings of the roots or ripened portions of the stems, or by layers.

R. aromatica (*R. suaveolens*).—A N. American shrub 8 ft. high, with downy leaves when young, thickish when old, and sweet-scented when crushed; leaflets 3, rhomboid-ovate, unequally cut and toothed. Flowers about April and May, pale yellow, in catkin-like spikes before the leaves appear, afterwards followed by red roundish fruits about the size of Currants. The variety *trilobata* is distinguished by its smaller leaves, the leaflets of which are distinctly lobed near the apex, and the odour is not so pleasant as in the type.

Culture &c. as above.

R. copallina.—A somewhat downy N. American shrub 1–7 ft. high. Leaves with winged stalks, and 9–21 oblong or ovate lance-shaped often entire leaflets, smooth and shining dark green above, downy beneath. Flowers in summer, greenish-yellow, in dense clusters at the ends of the shoots. The female flowers are borne on one plant, the male ones on another.

Culture &c. as above. In its native country this species grows 25–40 ft. high, and its foliage assumes beautiful tints.

R. Coriaria.—A native of S. Europe, 15–20 ft. high, with hairy leaves, composed of 11–15 elliptic, large, bluntly toothed leaflets becoming purple-red in autumn. Flowers in summer, whitish-green. This species furnishes the Sumach of commerce, but is very rarely met with in cultivation.

Culture &c. as above. It is hardy perhaps only in the mildest parts of the kingdom.

R. cotinoides (*Cotinus americanus*). This is the 'Chittam Wood' of the South United States, where it assumes the proportions of a small tree 25–35 ft. high, with a trunk over 1 ft. in diameter. It is only a small shrub in cultivation, and very much resembles the European *R. Cotinus* in appearance, but is not so bushy in habit. The large roundish and undivided leaves form the chief beauty of the plant, especially in the autumn when they assume beautiful shades of scarlet and crimson suffused with tints of yellow and orange.

Culture &c. as above. As this species is very scarce even in its native country, care should be taken to see that the following species is not supplied in its place.

R. Cotinus (*Smoke Plant; Wig Tree; Venetian Sumach*).—A graceful slender-stemmed shrub 6–8 ft. high, native of S. Europe, with obovate or circular, shortly stalked leaves about 1–3 in. long. Flowers in June and July, pale purple or flesh-coloured outside, in loose panicles, the pedicels becoming hairy and lengthened after flowering. The variety *pendula* has drooping instead of erect branches, and *atropurpurea* is remarkable for the purple hues of the leaves, young shoots, and flower clusters.

Culture &c. as above. This species

will flourish in almost any soil. The leaves look very ornamental in autumn when they assume a rich yellow colour, often turning to bronzy-purple. Seeds are freely produced.

R. glabra (*R. caroliniana; R. coccinea; R. elegans; R. sanguinea*).—A beautiful N. American shrub 5–8 ft. high, with smooth leaves divided into 17–21 lance-shaped oblong serrate leaflets, whitish beneath. They assume rich red tints in autumn. Flowers in June, males greenish-yellow, females greenish-red. Seeds are freely produced, and the clusters of fruits look very handsome during the autumn and winter months. The variety *laciniata* (known as the 'Fern-leaved Sumach') is very elegant, with beautifully cut and divided leaflets longer and broader than in the type.

Culture &c. as above, p. 319.

R. Michauxi.—A native of the South United States having erect stems 2–3 ft. high, and spreading extensively by means of underground creeping rootstocks. The leaves are pinnately divided, but the beauty of the plant consists largely in the bright scarlet pyramidal fruit clusters, which are clothed with a silky down.

Culture &c. as above. This species is not yet well known, but it may become a very popular plant, should it prove quite hardy in this country.

R. Osbecki.—A very distinct and handsome shrub, native of China and Japan, where it attains a height of about 20 ft. The large pinnate leaves are composed of 5 or more pairs of leaflets, some of which are about 6 in. long and 4–5 in. broad, with large blunt teeth on the margins, and a short down beneath. The leaf stalk in between the leaflets is winged as in *R. copallina*, and in autumn the foliage assumes beautiful tints of red and orange, which are more vivid in favourable seasons. The unattractive flowers are produced in July and August in large clusters at the ends of the branches, and seeds are freely produced.

Culture &c. as above.

R. succedanea (*Red Lac Sumach*).—A beautiful Japanese shrub 10–15 ft. high, with smooth leaves over 1 ft. long and divided into several pairs of ovate lance-shaped tapering leaflets, netted with veins, glaucous beneath. Flowers in summer, greenish-yellow, succeeded by white Cherry-like fruits.

Culture &c. as above. This species is usually grown in a cool greenhouse, but will grow well out of doors in the milder parts of the country. It is remarkable for the beautiful reddish and crimson tints of the young leaves, which turn green as they develop, but again assume coloured hues in autumn before they fall.

R. Toxicodendron (*Poison Ivy; Poison Oak*).—A somewhat climbing N. American and Japanese species with leaves divided into 3 leaflets, 1½–6 in. long, rhomboid-ovate, pointed, rather downy beneath, variously notched and lobed. Flowers in June, greenish-yellow.

Culture &c. as above. This remarkable plant should be carefully handled, as it has poisonous effects on some people. The variety *radicans* has leaves almost or quite entire. In shady places both species and variety may be allowed to ramble over rocks or boulders, tree stumps &c., looking very pretty in autumn with the purple-red coloured foliage. Seeds are freely produced.

R. trichocarpa.—A beautiful shrub or small tree recently introduced from Japan, where it grows 20–25 ft. high. The leaves are about 20 in. long with deep red midribs, and broadly ovate, tapering leaflets, which assume bright scarlet and orange tints in autumn in a wild state. The unattractive flowers are produced in July, and give place later on to drooping clusters of large prickly drupes.

Culture &c. as above. Only small plants are at present in cultivation, and, according to Mr. Bean, they have coloured well at Kew. Should this species prove hardy in our climate, and colour well, it will be a great acquisition for producing fine effects in autumn.

R. typhina (*Stag's Horn Sumach; Vinegar Tree*).—A well-known N. American tree 10–30 ft. high, with large hairy pinnate leaves and densely hairy thick shoots. Leaflets 11–31, glaucous beneath, oblong lance-shaped, pointed, deeply serrate, the veins and main rachis clothed with velvety rusty hairs. Flowers in June and July, greenish-yellow, in erect cone-like clusters, the male and female flowers being borne on separate plants. Seeds are freely produced, and the fruit clusters being clothed with deep crimson or dull reddish hairs look very attractive in autumn and winter. The variety *arborescens* has leaves slightly downy beneath; and *frutescens* downy and whitish beneath.

Culture &c. as above.

R. venenata (*R. vernix*).—*Poison Elder, Sumach,* or *Dogwood.*—A very poisonous but handsome N. American tree 6–18 ft. high, with rather smooth leaves composed of 7–13 obovate-oblong entire leaflets. Flowers in July, green, in loose slender axillary panicles. The female plants occasionally produce ripe seeds contained in small Pea-like berries which hang down in graceful clusters in autumn.

Culture &c. as above. Great care should be taken not to let the juice of this plant touch the hands or any part of the body, as it is quite as poisonous as *R. Toxicodendron.*

R. vernicifera (*Japan Lacquer* or *Varnish Tree*).—A Japanese tree 30 ft. high with Walnut-like leaves, having 11–13 elliptic acute entire leaflets, smooth above, with a velvety down beneath. Flowers in June, greenish-yellow.

Culture &c. as above. This is a very graceful shrub, and will survive an ordinary winter out of doors, except, perhaps, in the bleakest and coldest parts of the British Islands. It likes a warm sheltered situation and plenty of sunshine.

PISTACIA.—A genus of half a dozen evergreen or deciduous trees or shrubs abounding in resinous juice, with alternate leaves, with or without an odd leaflet at the apex, sometimes 3-foliolate. Flowers small without petals, diœcious, in axillary clusters. Calyx 5-cleft or parted in the male flowers; 3–4 in the female ones. Stamens 5, very short; absent in the female flowers. Fruit a dry one-seeded drupe.

Culture and Propagation.—The Pistacias thrive in a rich, deep, sandy loam in sheltered situations against a wall. They may be increased by layers or cuttings of the ripened shoots inserted in autumn under a handlight or in gentle heat. As garden plants the Pistacias are not of great value, although they are important from an economical point of view.

P. atlantica.—An evergreen tree, 40 ft. high, native of the Canary Islands, with oddly pinnate leaves, leaflets tapering to the base.

Culture &c. as above.

P. Lentiscus (*Mastich Tree*).—Native of S. Europe 20 ft. high, with abruptly pinnate leaves, having winged stalks and lance-shaped leaflets. Flowers in spring, green. This plant yields the drug Mastich. The variety *angustifolia* has almost linear leaflets; in *chia* they are ovate.

Culture &c. as above.

P. Terebinthus (*Turpentine Tree*).—A deciduous tree 30 ft. high, native of S. Europe, with numerous ovate lance-shaped leaflets, of a beautiful reddish hue when young. Flowers in June, greenish, with dull yellow anthers and crimson stigmas.

The Chian or Cyprus Turpentine is obtained from this tree by making incisions in the trunk.

Culture &c. as above.

P. vera (*Pistachio Nut Tree*).—A deciduous Syrian tree, 20 ft. high, with pinnate leaves, and ovate leaflets tapering at the base. Flowers in April, brownish-green. Fruits about 1 in. long, ovate, reddish, with an oblique point.

Culture &c. as above.

XXXVII. CORIARIEÆ

An order of unarmed shrubs with angled branches and usually opposite ovate heart-shaped or lance-shaped leaves, 1–5-nerved, entire, smooth, without stipules. Pedicels axillary or racemose, with small greenish hermaphrodite or almost polygamous flowers. Sepals 5. Petals 5, shorter than the sepals, hypogynous, fleshy, keeled outside. Stamens 10, hypogynous, free, or adnate to the keel of the petals. Carpels 5–10, distinct, more or less fleshy.

CORIARIA.—This is the only genus of the order, and its botanical characters are as described above. It contains five or six species, but the one described below is the only hardy one at present much known. There are, however, a few other species in cultivation, viz. *C. nepalensis* from the Himalayas, and *C. thymifolia* from Peru; *C. japonica* and *C. terminalis* from Japan.

C. myrtifolia. — A handsome shrub 3–6 ft. high, native of S. Europe. Leaves ovate lance-shaped, simple, 3-nerved, smooth and glaucous, on very short stalks. Flowers from May to August, greenish.

Culture and Propagation. — It will grow in ordinary garden soil, and may be increased by suckers or layers in the autumn. Seeds may also be sown as soon as ripe, or in spring in cold frames.

Series III. CALYCIFLORÆ (see p. 124)

XXXVIII. LEGUMINOSÆ—Laburnum and Broom Order

A very extensive order with 6,500 species growing in all parts of the world. It is divided into three large suborders, Papilionaceæ, Cæsalpineæ, and Mimosæ. The two first named are the only ones represented out of doors in the British Islands, and their characters are described in proper sequence, with the genera and species belonging to each.

SUB-ORDER I. PAPILIONACEÆ.

The plants in this group consist of trees shrubs or herbs of very varied character. Leaves with 2 stipules, alternate, simple or often digitately or pinnately compound. Flowers irregular, usually hermaphrodite. Sepals usually 5 more or less united. Petals 5, unequal; the upper one (known as the 'standard') free, larger than the 2 side ones (known as the 'wings'), which latter enclose and sometimes adhere to the 2 more or less united and upward curved lower ones (known as the 'keel'). The keel usually encloses the 10 perigynous stamens, united in a sheath, or the upper one only free; rarely all free. Fruit a 1-celled, usually dehiscent pod, with one or more seeds.

ANAGYRIS. — A small genus of shrubs with alternate stalked digitately 3-foliolate leaves, opposite which are placed two united stipules. Flowers rather large, yellow, borne in short racemes at the tips of the branches. Calyx teeth or lobes nearly equal. Standard shorter than the oblong wings, roundish, not reflexed at the sides. Stamens free.

A. fœtida. — A rather ornamental shrub 6–8 ft. high, native of S. Europe, and remarkable for the disagreeable odour it emits when bruised. The leaves are composed of three spreading lance-shaped acute leaflets, and the yellow hairy Laburnum-like flowers are produced in May and June in short racemes at the tips of the branches.

Culture and Propagation. — This species is hardy as far north as the Thames Valley in ordinary winters, but would probably require protection in the event of severe weather. It may be grown in well-drained sandy loam and peat or leaf-soil in warm and sheltered spots with plenty of air. It may be increased during the summer months by inserting cuttings of the half-ripened shoots in sandy soil under a handlight and protecting them under glass until the following spring.

PIPTANTHUS (*Nepalese Laburnum*).—A genus, the characters of which are described in the only species it contains, viz.:—

P. nepalensis (*Thermopsis nepalensis*). A handsome evergreen shrub, about 10 ft. high, native of Nepaul, with alternate, stalked, digitately 3-foliolate leaves, and lance-shaped-acute, slightly hairy leaflets. Flowers in spring, large, yellow, in short racemes at the ends of the branches. Calyx-lobes almost equal; standard reflexed at the sides; wings obovate oblong; keel scarcely incurved. Stamens 10, free.

The variety *aurea* may be recognised

by means of the yellow and green stripes on the bark. Closely related is *P. tomentosus* from China, which, however, may be distinguished by the silky down which covers the leaves and branches.

Culture and Propagation. — This plant is best on sheltered walls in the milder parts of the country, in rich sandy loam, although in favourable places it may also be grown as a bush like the Laburnum. It is only in severe winters that the tips of the shoots are likely to be injured. It is easily increased by seeds which ripen in this country. They may be sown under glass as soon as ripe, or in spring, afterwards pricking the seedlings out and growing on for a season or two in pots until the plants are large and strong enough to be placed out of doors. Cuttings of the ripened shoots will also root, and layers may be made in autumn.

THERMOPSIS.—A genus containing about 12 species of perennial herbs, with alternate digitately 3-foliolate leaves, and free leafy stipules. Flowers in terminal racemes, or opposite the leaves. Calyx more or less bell-shaped with nearly equal lobes or teeth. Standard almost equal to the oblong wings, reflexed at the sides; keel almost equal to or longer than the wings. Stamens 10, free. Pods almost sessile or slightly stalked.

Culture and Propagation. — These plants succeed best in light rich well-drained soil, and are most surely increased from seeds, sown either as soon as ripe, or in spring, in cold frames or in gentle bottom heat. When the roots are divided the plants not unfrequently die.

T. barbata.—A Himalayan perennial 1 ft. or more high, with sessile smoothish often opposite leaves, and oblanceolate leaflets, and similar stipules. Flowers in June, deep purple, 1 in. long.

Culture &c. as above.

T. corgonensis.—A plant 1-2 ft. high native of the Corgon Alps. Leaves sessile or very shortly stalked, with ovate acute leaflets, which with the leafy stipules make a half-whorl. Flowers in summer, twin, yellow, almost stalkless.

Culture &c. as above.

T. lanceolata (*Podalyria lupinoides*). A native of Kamtschatka about 1 ft. high. Leaves almost stalkless with oblong lance-shaped leaflets having silky down on both surfaces; stipules half as long as the leaflets. Flowers in summer, twin, yellow, with large bracts.

Culture &c. as above.

T. montana (*T. fabacea*).—A beautiful silky-haired N. American perennial 1-2 ft. high. Leaves stalked with broadly ovate leaflets, and broadly ovate blunt stipules. Flowers in summer, yellow, alternate.

Culture &c. as above.

BAPTISIA (*False Indigo*).—A genus with about 14 species of herbaceous perennials, all natives of N. America. Leaves alternate digitately 3-foliolate, or simple and sessile, or perfoliate. Stipules usually small, or rarely large and leafy. Flowers white, yellow or blue in terminal racemes, or opposite the leaves on a stalk. Calyx obtuse or somewhat bell-shaped. Petals almost equal, the standard being roundish, reflexed at the sides; the wings oblong, and the keel slightly curved upwards. Stamens 10, free. Pod stalked, ovoid or nearly globose, swollen, often leathery.

Culture and Propagation. — The Baptisias grow freely in rich loamy soil, and may be easily increased from seeds sown in cold frames as soon as ripe, or out of doors in mild weather in spring; or by dividing the rootstock very carefully in early autumn, or in spring as growth is commencing.

B. alba.—A pretty perennial about 2 ft. high. Leaves stalked, smooth, with elliptic oblong blunt leaflets. Flowers in June, white.

Culture &c. as above.

B. australis.—A fine species 4-5 ft. high, with spreading branched smooth stems. Leaves glaucous, stalked, smooth, with blunt oblong wedge-shaped leaflets and lance-shaped acute stipules twice the length of the leaf stalk. Flowers in June, purple or blue, with white keels.

Culture &c. as above. This is the best and most generally grown species, and when grown in large masses produces a fine effect. There is a variety called *versicolor*.

B. confusa.—A plant 1-2 ft. high, with smooth-stalked leaves, oblong wedge-shaped leaflets, and linear lance-shaped stipules twice the length of the leaf stalk. Flowers in June, dark blue.

Culture &c. as above.

B. exaltata.—A pretty perennial 3–4 ft. high. Leaves ternate, stalked; leaflets lance-shaped obovate; stipules 3 times longer than the leaf stalk. Flowers in June, deep blue.

Culture &c. as above.

B. leucophæa.—A perennial about 1 ft. high. Leaves unstalked, rather hairy; leaflets rhomboid-obovate; stipules and bracts ovate acute, broad, leafy. Flowers in July, creamy-white, all leaning to one side.

Culture &c. as above.

B. minor.—A plant 1-2 ft. high. Leaflets rhomboid lance-shaped; stipules lance-shaped, longer than the leaf stalks. Flowers in June, blue.

Culture &c. as above.

B. perfoliata.—A pretty perennial about 3 ft. high. Leaves perfoliate, roundish, entire, glaucous. Flowers in August, yellow, small.

Culture &c. as above.

B. tinctoria. — A handsome species 2–3 ft. high. Leaves stalked; leaflets roundish obovate; stipules bristly, almost obsolete. Flowers in summer, yellow.

Culture &c. as above. Unless this species finds itself in a really favourable situation one is apt to regard it as an inferior plant.

LUPINUS (LUPINE). — A genus consisting of 80 species of herbaceous annuals and perennials, rarely undershrubs. Leaves simple, or digitately 5–15- or many-foliolate, rarely 3-foliolate; stipules adnate to the base of the leaf stalk. Flowers in erect terminal racemes. Calyx deeply 2-lobed. Standard petal roundish or broadly ovate; wings sickle-shaped-oblong or obovate, united at the tips; keel ending in a curved beak. Stamens 10, united in one bundle. Pod more or less compressed, silky-haired, leathery or fleshy.

Culture and Propagation. — The Lupines nearly all thrive in ordinary good garden soil. They will not, however, flourish in soils heavily charged with chalk or lime. The presence of either of these ingredients may be readily detected by beating up a little of the soil in a tumbler of clean, and if possible distilled, water. After allowing the soil to settle at the bottom, the water may be breathed into strongly. If it assumes a milky colour, then lime is present.

The annual and perennial kinds may both be easily raised from seeds sown in early spring out of doors in the places where the plants are to flower. As the annual kinds do not bear transplanting very well, the seeds should be sown very thinly, and afterwards if the plants are too close together they must be thinned out. The perennials may be further multiplied by dividing the rootstocks at the same period.

Lupines are easily recognised by their radiating leaflets as well as their tall spikes of blossom. They are very valuable for the decoration of the herbaceous border when grown in bold masses, and some of the finest may be grouped in large beds on the grass.

L. affinis.—A Californian perennial about 9 in. high, with deep blue flowers.

Culture &c. as above.

L. arboreus (*Tree Lupine*). — A roundish bush 2–4 ft. high, with lanceolate-linear leaflets clothed with a soft silvery down. The beautiful fragrant yellow flowers appear in great profusion in summer. There is a purple-flowered variety and some inferior yellow ones.

Culture and Propagation.—This fine species differs from the annual and herbaceous perennial kinds in being of a more or less woody character. In favourable situations it attains a very great size and diameter, and when covered with its fragrant blossoms is very attractive. Being a native of California it likes warm, sunny and sheltered situations, and in unfavoured parts of the kingdom may be grown against a south wall. It may be increased by seeds sown in a cold frame or pots when ripe, and also by cuttings of the plump and fairly well-ripened shoots in summer, inserted in sandy soil in a cold frame or in gentle bottom heat.

L. aridus.—A N. American perennial 1 foot high, with linear lance-shaped leaflets. Flowers in late summer, purple-blue.

Culture &c. as above.

L. Chamissonis (*L. albifrons*). — A Californian perennial 3 ft. high, covered with a silvery silky down. Leaflets obovate-oblong, narrowed at the base. Flowers in September, blue.

Culture &c. as above. Increased by seeds and division.

L. fallax.—An ornamental bush 3–5 ft. high, native of Mount Tamalpais, to the west of San Francisco Bay. It has a neat symmetrical habit, and silvery leaves divided into 7–9 linear lance-shaped acute leaflets 1½–2½ in. long. The beautiful violet-coloured flowers are borne in summer on long spikes in great profusion.

Culture &c. as above for *L. arboreus.* This plant requires to be grown in a warm sheltered position.

L. Hartwegi.—A beautiful Mexican species 1½–2 ft. high. Leaflets 7–9, oblong lance-shaped; stipules linear, very long. Flowers late in summer, varying from pale to dark blue, the standard petal shaded with white or rose. There are white and rose-coloured forms.

Culture and Propagation.—This ornamental species is in reality a perennial in warm dry localities, but in unfavourable parts it is likely to perish in winter; it is therefore best treated as an annual, and raised from seeds every year as recommended above for *L. luteus.*

L. laxiflorus (*L. arbustus*).—A North American perennial 12–18 in. high, with linear lance-shaped leaflets. Flowers late in summer, blue, the keel and base of the wings being reddish.

Culture &c. as above. Increased by seeds or division.

L. lepidus.—A perennial about 6 in. high, native of N. America, with lance-shaped leaflets silky on both sides. Flowers in late summer, purple-blue, the standard petal having a white spot at the base.

Culture &c. as above. Increased by seeds or division.

L. leptophyllus.—A Mexican perennial 1–3 ft. high. Leaflets linear acute, with a few silky hairs on each surface. Flowers in summer, violet.

Culture &c. as above. Increased by seeds or division.

L. leucophyllus (*L. plumosus*). — A very hairy N. American perennial 2–3 ft. high, with 7–9 oblong-lance-shaped leaflets and awl-shaped woolly stipules. Flowers from June to November, pink.

Culture &c. as above. Increased by seeds or division.

L. littoralis (*L. nootkatensis fruticosus; L. versicolor*).—A N. American perennial 1 ft. high. Leaflets 5–7, linear spoon-shaped, silky on both surfaces. Flowers from June to October, purplish-blue.

Culture &c. as above. Increased by seeds or division.

L. luteus (*L. odoratus*).—A S. European annual 1–1½ ft. high. Leaflets 7–9, oblong, lower ones obovate. Flowers from June to August, yellow, fragrant. The variety *leucospermus* has entirely white seeds.

Culture &c. as above. Seeds may be sown out of doors in April and May, and in the milder parts of the country in early autumn as soon as ripe.

L. Menziesi (*L. sulphureus*).—A remarkable silky-haired Californian annual, about 2 ft. high. Leaflets 9–11, oblong lance-shaped. Flowers in July and August, slightly fragrant, sulphur-yellow to orange. The variety *superbus* is a finer flowering form.

Culture &c. as above for *L. luteus.* Seeds to be sown annually.

L. Micheneri.—An herbaceous perennial, native of N. California. It has a somewhat trailing habit, and looks pretty in spring and summer, although the dull purple or brownish-green flowers are not particularly attractive.

Culture &c. as above. Increased by seeds and division.

L. microcarpus. — A N. American annual 1½ ft. high. Leaflets 9–10, lance-shaped, smooth above, hairy beneath. Flowers in April, blue, about 6 in a whorl.

Culture &c. as above for *L. luteus.* Seeds to be sown annually.

L. mutabilis.—A beautiful Colombian annual 3–4 ft. high; leaflets 7–9, bluntly lance-shaped, rather glaucous and downy beneath. Flowers from June to August, fragrant, large, the standard petal white changing to blue, with a large yellow mark in the centre; wings white faintly striped; keel white. *Cruikshanki* and *varicolor* are desirable varieties. The plant known as *hybridus atrococcineus* is a beautiful free-flowering variety with deep scarlet blossoms, and has probably originated from forms of *L. mutabilis.*

Culture &c. as above, and as for *L. luteus.* Seeds to be sown annually.

L. nanus (*Common Dwarf Lupine*). A pretty Californian annual 1 ft. or more high. Leaflets 5–7, narrow lance-shaped acute, hairy. Flowers in early summer, lilac and blue. The variety *albus* has white flowers; *albo-coccineus* is very compact in habit, with flowers white and rosy-carmine.

Culture &c. as above for *L. luteus.* Seeds to be sown annually. This species and its varieties are very free-flowering and are effective in beds or masses.

L. nootkatensis.—A perennial 1-1½ ft. high, native of Nootka Sound. Leaflets 7-8, obovate lance-shaped, hairy. Flowers from May to July, blue, mixed with purple, white or yellow, and streaked with deeper veins.

Culture &c. as above. Increased by seeds or division.

L. ornatus.—A N. American perennial 1-2 ft. high. Leaflets linear lance-shaped, covered with silvery silky down on both sides. Flowers from May to November, pale blue, with deeper coloured wings, and a ciliated keel.

Culture &c. as above. Increased by seeds or division.

L. perennis.—A pretty perennial about 2 ft. high, native of N. America. Flowers from May to July, blue.

Culture &c. as above. Increased by seeds or division.

L. pilosus (*L. hirsutus*).—A hairy S. European annual 2-4 ft. high. Leaflets 9-11, oblong lance-shaped. Flowers in summer, blue, the centre of the standard petal deeper in colour. The variety *alba* has white flowers, and *roseus* pale rose ones.

Culture &c. as above for *L. luteus.* Seeds to be sown annually.

L. polyphyllus (*L. grandifolius; L. macrophyllus*).—A strikingly beautiful and well-known vigorous perennial 3-6 ft. high, native of California. Leaflets 11-15, lance-shaped, hairy beneath. Flowers in summer, in great profusion, varying from blue to purple and reddish-purple and white. There are several variations known as *albiflorus*, *argenteus*, *flexuosus*, *laxiflorus*, *Lachmanni*, *rivularis* &c. *Variegatus* has violet-blue flowers streaked with white. The white-flowered variety (*albiflorus*) is very charming, and the only way to increase a really good form of it is by dividing the root clumps.

Culture &c. as above recommended for the perennial species. Seeds may be also sown in cold frames as soon as ripe, or a few in small pots, from which latter the seedlings may be transferred in spring without breaking the ball of soil.

L. pubescens.—A branching downy annual 2-3 ft. high, native of Mexico and Guatemala. Leaflets 7-9, lance-shaped; stipules awl-shaped. Flowers from July to September, violet-blue, with a white centre, becoming deep purple. *Ehrenbergi* is a variety of this species.

Culture &c. as above for *L. luteus.* Seeds to be sown annually.

L. Sabini.—A N. American perennial 2-3 ft. high. Leaflets 7-12, lance-shaped, pointed, silky. Flowers in early summer, yellow.

Culture &c. as above. Increased by seeds and division.

L. subcarnosus (*L. bimaculatus; L. subramosus; L. texensis*). — An elegant downy-stemmed annual about 1 ft. high, native of Texas. Leaflets 5, obovate lance-shaped, thick or fleshy. Flowers from July to September, deep rich blue, with a yellow blotch at the base of the standard petal; keel white, tipped with blue.

Culture &c. as above for *L. luteus.* Seeds to be sown annually.

L. tomentosus.—A beautiful Peruvian perennial 4-5 ft. high, covered with short silky hairs. Leaflets 8-10, oblong, bluntish, mucronulate, tapering to the base. Flowers in summer, large, variously coloured blue, purple, rose &c.

Culture &c. as above. Increased by seeds or division. This species may not be quite hardy in the coldest parts of the country.

L. tricolor elegans (*L. Dunnetti*).—A very pretty slightly downy annual of uncertain origin. Leaflets 7-9. Flowers in summer, standard petal deep violet or purple becoming deeper in colour with age; wings and keel white.

Culture &c. as above for *L. luteus.* Seeds to be sown annually.

L. varius (*L. semiverticillatus*).—An annual, 2-3 ft. high, native of Spain, and also found in most parts of S.W. Europe. The stems and leaves are covered with a whitish silvery down. Leaflets usually 5-6, oblong-lance-shaped, hairy beneath. Flowers in summer, usually dark blue, large, often splashed with white.

Culture &c. as above, and for *L. luteus.* Seeds to be sown annually.

L. venustus.—A downy Californian annual 1½-2 ft. high. Leaflets 9 11, obovate-lance shaped, slightly hairy beneath. Flowers from July to September, deep purple or violet, with a white keel.

Culture &c. as above for *L. luteus.* Seeds to be sown annually.

ADENOCARPUS.—A genus consisting of 8 species of silky, downy, or hairy shrubs, with digitately 3-foliolate leaves and yellow flowers in terminal racemes. Two upper lobes of calyx free; 3 lower more or less connate. Standard petal roundish; wings obovate or oblong; keel much incurved or slightly beaked. Stamens 10, united in one bundle. Pod linear, compressed, with glandular prickles.

Culture and Propagation.—These plants thrive in a mixture of loam, peat, and sand, and are very useful plants for borders or shrubberies, which are brightened by their elegant yellow flowers. Plants may be increased by seeds, layers, or cuttings, the latter being put under a glass in sandy soil in summer and autumn. The species mentioned below are the hardiest in this country.

A. decorticans (*A. Boissieri*).—A beautiful Spanish shrub, somewhat resembling the Common Furze in appearance and habit. The branches, however, are quite free from spines, but are densely clothed with leaves cut into 2-3 foliolate linear leaflets. During the early summer months masses of large golden-yellow blossoms are freely borne, and look very effective against the deep green of the foliage.

Culture &c. as above. It is easily raised from seeds, but as the seedlings do not transplant well, they are best grown on in pots until large enough to transfer to their permanent positions.

A. hispanicus.—A deciduous Spanish shrub 2-4 ft. high, with hairy branches, and 3-foliolate, clustered leaves. Flowers in June, yellow, in crowded racemes.

Culture &c. as above.

A. intermedius.—A deciduous shrub 3-4 ft. high, native of S. Italy and Sicily, with rather shaggy branches. Flowers in May, not crowded on the racemes.

Culture &c. as above.

A. parvifolius.—A deciduous species 3-4 ft. high, native of exposed heaths in France. Branches smooth. Flowers in May, yellow, not crowded on the racemes

Culture &c. as above.

A. telonensis.—A deciduous native of S. France, 2-4 ft. high. Flowers in June, yellow, not crowded on the racemes.

Culture &c. as above.

LABURNUM (Golden Rain; Golden Chain).—A genus with a few species of ornamental smooth or downy trees or shrubs, with digitately 3-foliolate leaves, inconspicuous stipules, and yellow flowers in terminal racemes. Calyx shortly 5-toothed. Petals free, clawed; standard petal ovate or round; wings obovate; keel incurved, bluntish, shorter than the wings. Stamens 10, united in one bundle. Pod linear, flatly compressed.

Culture and Propagation.—Laburnums thrive in almost any soil and situation, but they are most effective as groups in open spaces. If near large trees or buildings, they soon become ungainly-looking and one-sided. The plants are easily raised from seeds, but there is great variation among them, some having short loose miserable clusters of flowers. The finest varieties—those with very long crowded clusters of bloom—are the best to grow, and they may be increased by grafting or budding on the commoner varieties. In making new plantations it is better to use young plants, as older ones are difficult to transplant and take a long time to recover from the shock to the roots. Fine varieties of Laburnum when in blossom always attract such great admiration that they are often planted as a result in all sorts of positions—suitable and otherwise—to the exclusion of other choice flowering trees and shrubs.

L. Adami (*Purple Laburnum*).—This remarkable tree, 15-20 ft. high, is supposed to be a 'graft' hybrid between the purple-flowered *Cytisus purpureus* and the yellow-flowered *Laburnum vulgare*, raised by Jean Louis Adam, from whom it takes its name. The flowers are intermediate in character and colour between the two parents, but sometimes yellow, purple, and intermediate flowers are seen on the same plant—the first two producing seeds, the latter sterile.

Culture &c. as above.

L. alpinum (*Cytisus alpinus*).—*Scotch Laburnum.*—A European tree 15-20 ft.

high, with ovate lance-shaped leaflets, rounded at the base. Flowers in June, yellow, in drooping clusters. *C. fragrans*, *C. hirsutum*, and *C. pendulum* are varieties, the characters of which are indicated in the names. The variety *Alschingeri* has very long clusters of flowers; *autumnale* flowers in autumn from the end of the current year's shoots; *Parkesi* has very long racemes of deep yellow flowers; *Watereri* has racemes a foot or more in length, and is probably the most beautiful of all.

Culture &c. as above, p. 327.

L. caramanicum.—A beautiful but not well-known shrub 3–4 ft. high, native of Asia Minor. Leaves small, shortly stalked, 3-foliolate. Flowers in June and July, bright yellow, in erect racemes forming a large truss at the ends of the shoots. Grows well in chalky soil.

Culture &c. as above, p. 327.

L. vulgare (*Cytisus Laburnum*).—*Common Laburnum.*—A tree 20–30 ft. high, native of Central and S. Europe. Branches round, whitish; leaflets ovate lance-shaped, downy beneath. Flowers from April to June, bright yellow, in drooping racemes often nearly a foot in length in the best forms.

There are several varieties, among which the best are: *aureum*, with golden-yellow leaves; *Carlieri*, with very narrow leaflets and long racemes; *involutum*, with the leaflets curled so as to form 'rings;' *quercifolium*, with leaflets sinuated and lobed, like a miniature Oak-leaf in outline; *serotinum*, flowers later than most of the others; *monstrosum fastigiatum* is a form with erect flexible branches; and *sessilifolium* is recognised by the absence of leaf stalks.

There is also a form with variegated leaves, which is not particularly attractive and may be regarded merely as a curiosity.

Culture &c. as above, p. 327.

PETTERIA.—This genus has been separated from Laburnum and Cytisus, and has only one species here described with the characters of the genus:—

P. ramentacea (*Cytisus Weldeni; Laburnum ramentaceum*). — A dwarf smoothish shrub, native of Dalmatia, with digitately 3-foliolate leaves, elliptic entire leaflets, and small, blunt or obsolete stipules. Flowers in spring, yellow, in dense terminal erect racemes. Calyx bell-shaped, 3-lobed, ciliated. Standard petal round; wings and keel oblong, rather straight; keel pouched on each side. Stamens 10, united. Pod broadly linear, rather sickle-shaped, compressed.

Culture and Propagation. — This species will flourish in ordinary good garden soil, and is suitable for massing with other shrubs. Seeds are freely produced, and plants may be readily raised from these when sown either in autumn or spring in cold frames, or out of doors in the milder parts of the country. Layers may also be made in autumn, and any particularly fine varieties may be grafted on seedling stocks of the commoner forms.

GENISTA (Rock Broom). — A genus with about 70 species of smooth or silky, armed or spiny shrubs. Leaves simple or rarely digitately 3-foliolate. Stipules minute or none. Flowers yellow, rarely white, either singly or in clusters at the ends of the branches. Calyx bell-shaped, the upper lobes usually free, the 3 lower united. Standard petal ovate; wings oblong; keel oblong, straight or slightly incurved. Stamens 10, united in one bundle. Pod roundish, ovate, oblong, or linear.

Culture and Propagation.—Genistas thrive in any good well-drained garden soil, and are easily increased from seeds. These may be sown as soon as ripe, or in spring, either out of doors for the hardier species, or in cold frames for the more tender ones. The seedlings are pricked out when large enough and given more room to develop, and are ultimately planted in their permanent positions.

As many species begin to show signs of decay after a few years' growth, it is always safe to raise young plants from seeds every two or three years to take the place of any that show signs of weakness.

G. ætnensis (*Spartium ætnense*).—A native of Sicily and Sardinia, 6–15 ft. high, with few linear silky leaves on the younger twigs only. With the advance of age the leaves drop and the slender green branches have to perform their duties. Flowers from June to August, in great profusion, the bright yellow clusters being in striking contrast to the deep green of the twigs.

Culture &c. as above.

G. anglica (*Needle Furze; Petty Whin*).—A prostrate British shrub 1–2 ft. high, with ovate-lance-shaped spiny leaves. Flowers in early summer (May and June), yellow, in short leafy racemes.

Culture &c. as above.

G. anxantica. — A dwarf spreading species, native of Italy, with ovate elliptic, rather leathery leaves, and a profusion of golden-yellow flowers late in summer.

Culture &c. as above. This is a good plant for massing in the rock garden in warm sheltered positions.

G. aspalathoides.—A pretty dense and compact spiny bush 1–2 ft. high, native of S.W. Europe. During the summer months (in July and August) it bears masses of yellow flowers.

Culture &c. as above. It is a good plant for the rock garden or for furnishing the sides of grassy slopes, banks &c.

G. ephedroides.—A stiffish spiny shrub 2-3 ft. high, native of Corsica and Sardinia. Leaflets 3, smooth, linear. Flowers in summer from June to August, yellow.

Culture &c. as above, p. 328.

G. germanica. — A European species about 18 in. high, with arching stems, and an abundance of bright yellow flowers in summer and autumn.

Culture &c. as above. A good rock garden plant.

G. hispanica. — A native of S.W. Europe, 6–12 in. high or more, with lance-shaped hairy leaves and stiffish branched spines. Flowers from May to July, large, yellow, fragrant, in crowded racemes. *Flore pleno* is a charming double-flowered variety.

Culture &c. as above, p. 328.

G. monosperma (*G. Retama*).—A slender-stemmed twiggy species 2–4 ft. high, native of the Spanish Peninsula. Leaves linear oblong, downy. Flowers in summer, white, silky, in lateral few-flowered racemes which give a charming appearance to the plant.

Culture &c. as above. This fine species is rather too tender for cultivation out of doors in the British Islands except in the mildest parts of the south and west. Even in such places it is safer to plant it in the warmest and most sheltered spots. A good plant for seaside places; grows well in sandy soil.

G. ovata.—A native of Central and S. Europe, 2–4 ft. high, with round, hairy, erect, striped stems, and hairy ovate leaves. Flowers in summer, yellow, in short clusters. This is probably one of the many forms of *elatior*, referred to under *G. tinctoria* below.

Culture &c. as above.

G. pilosa (*Greenweed*). — A dense prostrate shrub, native of the gravelly heaths in the S. and S.W. of England, with obovate-lance-shaped blunt downy leaves. Flowers in May and June, bright yellow, axillary on short stalklets.

Culture &c. as above. A good plant for dry places in the rock garden.

G. radiata (*Spartium radiatum*).—A native of Central and S. Europe, 1–5 ft. high, with smooth angular branches. Leaflets 3, linear, silky. Flowers in summer (June and July), bright yellow, borne at the ends of the branches.

Culture &c. as above. A good plant for dry soils.

G. ramosissima (*G. cinerea*).—A native of S. Spain about 3 ft. high, with slender twiggy branches. Flowers in July, yellow, in great abundance.

Culture &c. as above.

G. sagittalis.—A distinct species less than 1 ft. high, native of S. Europe, having two-edged, wing-like branches, with ovate lance-shaped leaves, and masses of yellow flowers in May and June, borne in erect racemes at the ends of the shoots.

Culture &c. as above.

G. tinctoria (*Dyer's Greenweed*).—A round-stemmed spineless shrub 1–2 ft. high, native of Britain. Leaves lance-shaped, smoothish. Flowers from July to September, bright yellow, in great profusion. The variety *elatior*, from the Caucasus, grows 4 or 5 ft. high, and bears large panicles of yellow flowers. It is known under many names, and is evidently a very variable plant. The variety *flore pleno* with double flowers is very attractive, and makes a good plant for the rock garden or on banks.

Culture &c. as above.

G. virgata.—A round-branched twiggy species 3–10 ft. high, native of Madeira. Leaves oblong lance-shaped, rather silky. Flowers from April to July, golden-yellow, in racemes at the end of nearly every twig. Occasionally the blossoms are borne a second time in autumn, but never in such great profusion as in the earlier part of the year.

Culture &c. as above. Although a native of Madeira, this species seems to be perfectly hardy out of doors, at least in the neighbourhood of London.

SPARTIUM (Rush or Spanish Broom). — This genus consists of only one species described below and including the generic characters.

S. junceum (*S. acutifolium; Genista juncea; Spartianthus junceus*). — A well-known beautiful shrub 6–10 ft. high, native of Mediterranean countries. Branches slender, twiggy, round, and usually without leaves or stipules. Flowers from June to August, large, bright yellow, in erect clusters, and great profusion. Calyx somewhat spathe-like. Standard petal large, round; wings obovate; keel incurved, pointed, longer than the wings. Stamens 10, united in one bundle. Pod elongate, linear, smooth, flat. There is a double-flowered form called *flore pleno*.

Culture and Propagation. — The Spanish Broom will grow well in any poor dry soil in exposed situations, and is useful for borders, shrubberies, or sunny banks. Several fine specimens may be seen on the banks of the Great Western Railway between Slough and Maidenhead. Plants are easily raised from seeds, which ripen in quantity. The seed-pods are best picked just before they begin to open, and if placed in shallow trays in a warm sunny place will soon ripen fully. The seeds may then be sown in the open border, but as a rule the seedlings will not appear until the following spring. They may then be transplanted in mild showery weather, when large enough, and if judiciously placed will form very striking features in the garden. Besides seeds, plants may be raised from cuttings. Shoots of the more or less ripened and flowerless stems may be inserted in sandy soil under a handlight in late summer or autumn and will be well rooted by the following spring.

In spring, before growth commences, old straggling plants may be cut down quite low. This will induce new and strong young growths to spring up from the base, and thus refurnish the plant and give it a better shape and appearance.

ULEX (Furze; Gorse; Whin).—A genus containing about a dozen species of sharply spiny shrubs, the leaves of which are reduced to spiny stalks or small scales. Stipules none. Flowers yellow, solitary or in short axillary racemes. Calyx membranous, coloured, 2-parted. Petals shortly clawed, nearly equal; standard ovate; wings and keel oblong, blunt. Stamens 10, united in one bundle. Pod ovate, oblong, and shortly linear, compressed or swollen.

Culture and Propagation. — The beauty of the Furze when in bloom is very well known. For covering banks, knolls, mounds &c. it is very useful, and requires no cultural skill. It is best to use young plants, as old ones are awkward to handle, and besides do not transplant well. Seeds germinate freely in spring, after having been sown as soon as ripe in autumn, but the special varieties may also be increased by cuttings of the ripened or half-ripened shoots placed under a handlight in late summer or autumn.

U. europaeus.—This is the well-known Gorse, Whin, or Furze, seen in such abundance on British commons, banks, &c. It grows 2–3 ft. high, and has the spines sometimes furnished with minute 1-foliolate hairy leaves. Flowers in February and March, yellow, ¾ in. long, odorous, with black hairs on the calyx. *Flore-pleno* is a beautiful double-flowered variety, almost hiding the branches with its wealth of bloom. *Strictus* (known as the Irish Furze) has stiffish erect branches. In Ireland the young shoots of Furze are often chopped up fine and given to horses.

Culture &c. as above.

U. nanus (*Cat Whin; Tam Furze*).—Also a native of the British Islands 1–3 ft. high, with drooping branches, and spines ½–1½ in. long. Flowers from July to November, ½ in. long, followed by pods which persist till the following year. The variety *Galli* has ascending branches, and stiff spines longer than those of *nanus* proper.

Culture &c. as above.

CYTISUS (Broom).—A genus with less than 40 species of shrubs, rarely spiny. Leaves 1–3-foliolate, or absent. Flowers yellow, purple, or white. Calyx more or less 2-lipped. Standard petals almost round, or ovate; wings obovate, or oblong; keel straight or incurved, obtuse or scarcely pointed. Stamens 10, united. Pod flat, compressed, oblong or linear, smooth or hairy,

Culture and Propagation. — The hardy Cytisus are ornamental shrubs, and grow well in ordinary garden soil, being useful in groups, borders, or shrubberies.

They are mostly raised easily from seeds sown in the open air as soon as ripe, or in cold frames in the case of the more tender varieties. The seedlings may be transplanted in spring to their permanent positions. The plants may also be increased by layers; or the choicer varieties may be grafted on the commoner sorts, but this is not recommended. Cuttings of the more or less ripened and flowerless shoots will root in fine sandy soil if inserted about August and September in a shaded spot and covered with a handlight. In spring when well rooted they may be transplanted. To secure the finest effects the plants should be grown in bold masses. As their roots strike down rather deeply into the soil these plants are particularly well suited for growing in dry sandy soils in which other shrubs will not thrive. As they do not however retain their vigour and floriferousness for many years, it is as well always to have a stock of young plants at hand.

C. **albus** (*White Spanish Broom*).—A round-stemmed, twiggy shrub, 6–10 ft. high, native of the Spanish Peninsula. Leaves sessile, 3-foliolate, with linear oblong silky leaflets. Flowers about Whitsuntide, white, in long clustered racemes, in great profusion. The variety *incarnatus* has wine-red flowers, and *multiflorus* is a free-flowering form of the type.

Culture &c. as above.

C. **Ardoini.** — A pretty rock plant, about 4 in. high, native of the Maritime Alps, with stiffish decumbent stems, springing from a knotted and twisted stock. Leaflets obovate, hairy, silky when young. Flowers in spring, bright yellow, 1–6 in the axils of each leaf.

Culture &c. as above. This charming little Broom flourishes in warm and dry positions in the rock garden, and is very effective during April and May when covered with masses of bright yellow blossoms.

C. **austriacus.** — A round-stemmed twiggy shrub 2–4 ft. high, native of Austria, and covered with close-pressed stiffish hairs. Leaflets spindle-shaped. Flowers in June, yellow. There is a variety called *leucanthus* with soft whitish or creamy-yellow blossoms.

Culture &c. as above.

C. **biflorus** (*C. elongatus*).—A spreading twiggy Hungarian bush, about 3 ft. high. Leaves 3-foliolate, with close-pressed hairs beneath. Flowers in May, bright yellow, about 1¼ in. long.

Culture &c. as above. This is a very variable species, and is known under many other names, such as *canariensis*, *caucasicus*, *ruthenicus*, *serotinus*, *uralensis* &c.

C. **capitatus.** — A hairy-branched European shrub, 2–4 ft. high. Leaflets ovate-elliptic, hairy. Flowers in June, yellow, numerous.

Culture &c. as above. This species is also known as *C. calycinus.*

C. **hirsutus.** — A decumbent shrub, with round twiggy branches, native of Europe. Leaflets obovate, hairy beneath. Flowers in June, yellow, clustered on very short stalklets.

Culture &c. as above.

C. **kewensis.** — This is a charming hybrid Broom raised as a chance seedling at Kew, between the small yellow-flowered *C. Ardoini* and the tall white-flowered *C. albus.* It has a trailing habit, resembling in that respect *C. Ardoini*, and during the later spring months produces its pale creamy-yellow blossoms in great profusion.

Culture &c. as above. To keep this beautiful plant quite true in character it is safer to increase it by means of cuttings, as plants raised from seeds are likely to vary a good deal, and would probably revert to one or the other parent eventually. For trailing over the surface of beds, in the rock garden, or sunny banks, this hybrid is a valuable acquisition.

C. **monspessulanus** (*Genista candicans; G. triangularis; G. triquetra*).—A native of S. Europe 2–4 ft. high, with triangular decumbent stems, and simple or 3-foliolate leaves; leaflets ovate lance-shaped, hairy. Flowers in summer, yellow, in short terminal racemes.

Culture &c. as above.

C. **nigricans.** — A downy Austrian shrub, 3–6 ft. high, with round twiggy branches. Leaves 3-foliolate, with elliptic leaflets. Flowers in June, yellow, in erect racemes.

Culture &c. as above.

C. **præcox.** — A beautiful flowering shrub 8–10 ft. high, with a free and graceful habit. It is a hybrid between the yellow-flowered *C. purgans* and the white-flowered *C. albus*, and first appeared more than thirty years ago. It makes a dense and compact growth, and the bright green slender twigs give it an evergreen character when not in blossom. From the middle of April till about the middle of May, the young shoots, often nearly 2 ft. long, are literally covered with masses of pale primrose-yellow flowers, which however emit a rather powerful and not particularly pleasant odour.

Culture &c. as above. The only way to keep this hybrid true to character is to increase it by cuttings inserted in sandy soil about August or September, as recommended above. It usually ripens seeds freely, but like many other plants of hybrid origin, the chances of obtaining the true variety from seeds are very remote.

C. purpureus (*Purple Broom*).—A beautiful wiry branched trailing shrub, with oblong leaflets, and purple flowers in May, in great abundance. Native of Eastern Europe.

Culture &c. as above. It is often grafted on standards of the Laburnum to show its weeping habit. Among rocks and boulders the branches look very effective when in bloom. There is a white-flowered variety called *albus*, and a pretty yellow-flowered one known as *ratisbonensis*.

C. scoparius (*Common Broom*).—A native shrub 2-10 ft. high, with slender angular hairy branches. Leaves 3-foliolate, with oblong leaflets. Flowers from April to July, yellow, solitary. There are several forms of this species, but the most important and beautiful is *andreanus* (*Genista andreana*), in which the wings of the yellow flowers are of a rich purple-brown. This variety is much grown as a pot plant, and is gently forced into bloom in greenhouses in early spring. Other varieties are *pendulus*, with a weeping habit; and *sulphureus*, with pale yellow sulphur-coloured blossoms.

Culture &c. as above. This showy shrub will flourish under almost any circumstances, except in wet, cold and boggy situations.

C. sessilifolius.—A smooth, round-branched shrub 4-6 ft. high, native of S. Europe. Leaflets 3, ovate. Flowers in May, yellow, in short erect racemes.

Culture &c. as above.

ONONIS (Rest Harrow).—A genus with about 60 species of smooth, downy or hairy, often clammy annual, biennial, or perennial herbs or undershrubs. Leaves usually pinnately 3-foliolate, with the veins running into teeth on the edges. Stipules adnate to the leaf stalk. Flowers rose, yellow, or white, in axillary solitary or 2-3-flowered racemes. Calyx tube short with nearly equal lobes. Standard petal nearly round, with a short claw; wings obovate oblong; keel incurved, beaked, rarely blunt. Stamens 10, united, or the upper one rarely free. Pod oblong or linear, inflated or round.

Culture and Propagation.—The Rest Harrows may be utilised for covering rough banks and parts of the rockery. They grow in any soil, and are easily increased by seeds, or division of the roots in early autumn or spring. The seeds may be sown as soon as ripe in warm sheltered spots out of doors, or in cold frames, and the seedlings may be transplanted the following spring. The shrubby kinds may also be increased by cuttings of the fairly well-ripened shoots inserted in sandy soil under a handlight about August and September.

Both *O. spinosa* and *O. reclinata* are British plants, usually found on dry pastures, fields, cliffs &c., and although pretty, perhaps hardly worth cultivating when there are so many better plants.

O. aragonensis.—A pretty half-hardy shrub 1-2 ft. high, with smooth 3-foliolate leaves composed of roundish serrate leaflets. The almost stalkless flowers appear from May to July on a leafless raceme, the yellow blossoms being usually in pairs.

Culture &c. as above. This species is fairly hardy in the neighbourhood of London, and ripens seeds freely.

O. fruticosa.—A handsome shrub 1-2 ft. high, native of S.W. Europe. Leaflets 3, sessile, smooth, lance-shaped, shining, unequally serrated. Flowers in summer, purple, three on a stalk.

Culture &c. as above. Increased by seeds or cuttings.

O. Natrix.—A S. European perennial 1½-2 ft. high, clothed with a clammy pubescence. Leaflets 3, oblong, serrated at the apex. Flowers in summer, yellow, veined with red.

Culture &c. as above. Increased by seeds or division.

O. rotundifolia.—A pretty rather shrubby perennial, 1-1½ ft. high, native of South Europe. Leaflets 3, obovate, roundish, toothed. Flowers in summer, rosy, three on a stalk.

Culture &c. as above. Increased by seeds or cuttings.

O. viscosa. — A handsome annual with downy clammy stems, 1½-3 ft. high. Leaflets 3, toothed, the middle one largest. Flowers in summer, yellow, in long spikes, the back of the standard striped with purple.

Culture &c. as above. Being an annual from S. Europe, the seeds of this species may be sown in cold frames in autumn or spring, afterwards transplanting the seedlings to their flowering positions. Or they may be sown during April and May in the open border where the plants are to bloom, thinning the seedlings out if too close together.

PAROCHETUS (Shamrock Pea).— A genus having only one species:—

P. communis.—An elegant creeping perennial about 3 in. high, native of the Himalayas. The stems, which root at the joints, have 3-foliolate Clover-like leaves, and during October and November the cobalt-blue Pea-like blossoms are produced either singly or 2 or 3 together in the axils of the leaves.

Culture and Propagation. — The Shamrock Pea is best grown in warm sunny parts of the rockery in well-drained soil. Owing to the late period of blooming, the beautiful blue flowers are often injured by frost, and in cold localities the plants would look better grown in pots in cold frames or a cool greenhouse. Propagation is effected by dividing the rooting stems in spring, or by sowing the seeds at the same period in gentle heat.

MEDICAGO (Lucern; Medick).—A genus with 40 species of herbs, only one of which is worth growing. Flowers yellow or violet, one or more on a stalk. Calyx shortly toothed or lobed. Petals free from the stamen-tube; standard obovate or oblong, contracted at the base; wings oblong, longer than the obtuse keel. Stamens 10, upper one free. Pod spirally sickle-shaped, or often shell-like, unarmed or spiny.

M. falcata.—A native prostrate perennial with stems 2-4 ft. long. Leaflets 3, oblong, toothed at the apex, entire at the base. Flowers in summer, usually pale yellow, but sometimes violet or green, in short close axillary racemes.

Culture and Propagation. — This species thrives in any soil, and is suitable for banks, slopes, or rough parts of the rock garden. It may be increased by seeds sown in the open border when ripe, or in spring, or the plants may also be increased by division in early autumn or spring.

TRIFOLIUM (Trefoil; Clover).— A genus containing 150-200 species of annual or perennial herbs, with digitately 3-, rarely 5-7-foliolate leaves, with stipules adnate to the stalks. Flowers in spikes, heads, or umbels, rarely solitary. Calyx teeth or lobes nearly equal. Petals often withering, long-clawed, or the 4 lower ones more or less adnate to the stamen-tube; standard oblong or ovate; wings narrow, longer than the blunt keel. Stamens 10, upper one free or rarely united at the middle with the others. Pod oblong or nearly round, or obovate-compressed.

Culture and Propagation. — The Trefoils are not particularly well-known flower garden plants, but a few of them are useful for creeping about in the rockery or on the margins of borders. They grow in almost any garden soil, and may be increased by division in autumn or spring, or from seed sown when ripe in the open border.

T. alpestre (*Owl-headed Clover*).—A pretty species 6-12 in. high, from the European Alps and W. Asia. Leaflets lance-shaped, leathery, ciliate toothed; stipules narrow, nearly sessile. Flowers in June and July, purple. Petals united.

Culture &c. as above.

T. fimbriatum.—A N. American species with long thick prostrate stems. Leaflets oblong or slightly wedge-shaped, 1 in. or more long, conspicuously fringed with bristly teeth. Flowers in autumn, purple; calyx teeth spiny.

Culture &c. as above.

T. fucatum. — A Californian annual 6 in. high. Leaflets roundish wedge-shaped, sharply toothed, thickish; stipules large, entire, abruptly pointed. Flowers in June, creamy-white mixed with red.

Culture &c. as above. Sow seeds annually in warm spots.

T. hybridum (*Alsike* or *Bastard Clover*). — A European species with flexuous stems 2-10 in. long. Leaflets obovate or oblong, ½-1½ in. long, toothed;

stipules oblong with triangular tips. Flowers from June to August, white or rosy, in heads about 1 in. in diameter.

Culture &c. as above.

T. **incarnatum** (*Crimson Clover*).—A pretty S. European annual 1 ft. high, with rather slender hairy stems. Leaflets broadly obovate or obcordate, ¾–1½ in. long. Flowers in June and July, bright crimson, ½ in. long; calyx hairy.

Culture &c. as above.

T. **Lupinaster** (*Bastard Lupine*).—A Siberian species 1–1½ ft. high. Leaves unstalked; leaflets 5, linear lance-shaped, sharply toothed and pointed; stipules broad, pointed. Flowers in summer, purple, large, wings and keel paler than the standard. There is a white form called *albiflorum*.

Culture &c. as above.

T. **olympicum**. — An erect hairy-stemmed species 1 ft. high, native of Mt. Olympus. Leaflets hairy, elliptic-lance-shaped, entire, stipules awl-shaped, sheathing. Flowers in July, yellowish, with a very long standard, calyx hairy.

Culture &c. as above.

T. **reflexum** (*Buffalo Clover*). — A handsome, more or less decumbent N. American annual, with stems 1–1½ ft. long. Leaflets obovate or obovate-oblong, crenulate serrate; stipules leafy, pointed. Flowers from April to June, with broadly ovate, rosy-red standard, and white wings and keel.

Culture &c. as above.

T. **repens purpureum** (*Four-leaved Shamrock*).—A variety of the common white Clover 3–5 in. high, with brown or purplish leaves having a broad purple spot on the under side of the leaflets. Flowers during summer, small, white, slightly fragrant.

Culture &c. as above.

T. **rubens**.—A native of Central and S. Europe 1 ft. high. Leaflets long narrow; stipules large. Flowers in summer, carmine or purple-red, in large ovoid heads.

Culture &c. as above.

T. **spadiceum** (*Brown Clover*). — A European species 6 in. high. Leaflets oblong-ovate, toothed; stipules leafy pointed. Flowers in summer, yellow, standard slightly brownish, obcordate.

Culture &c. as above.

T. **uniflorum**. — A tufted creeping Syrian species with very short stems. Leaflets 3, ovate, pointed, toothed, nerved; stipules sheathing, long pointed. Flowers in June and July, reddish, in thick ovoid heads on long stalks.

Culture &c. as above.

ANTHYLLIS (KIDNEY VETCH).—A genus with 20 species of herbs or undershrubs usually with pinnate leaves, rarely reduced to the terminal leaflets. Stipules small, or none. Flowers usually in axillary heads or clustered at the ends of the branches. Calyx tubular or inflated, 5-toothed. Petals nearly equal, long-clawed; standard ovate, abrupt or 2-auricled at the base; wings ovate, blunt; keel smaller than the wings, incurved, bluntish, swollen at each side. Stamens 10, usually united. Pod ovoid, or shortly linear, falcate or curved.

Culture and Propagation. — When in bloom the Kidney Vetches are pretty plants, and look well in the rock garden in sunny positions, and in usually well-drained warm soil. The annual kinds may be raised from seeds sown in the open about April. The perennials may also be raised in the same way, or from cuttings in sandy soil under a glass during the later summer months. Division of some kinds may also be practised in autumn or spring.

A. **Barba-Jovis** (*Jupiter's Beard*).—A downy Spanish shrub 4–8 ft. high. Leaflets 9–13, oblong-linear. Flowers in March, pale yellow, numerous.

Culture &c. as above. Increased by seeds or cuttings.

A. **erinacea** (*Erinacea hispanica*).—A distinct spiny almost leafless species 6–12 in. high, native of Spain. Leaves few, oval or oblong. Flowers in April, bluish-purple.

Culture &c. as above. Increased by seeds or division. Requires a warm sheltered position on the rockery.

A. **Hermanniæ** (*Cytisus græcus*).—A shrubby Corsican species 2–4 ft. high, with almost stalkless simple or 3-foliolate leaves, more or less downy. The yellow flowers appear in April in the axils of the upper leaves.

Culture &c. as above. Increased by seeds or cuttings.

A. **montana**.—A pretty tufted silky and hoary rock plant, 3–6 in. high, native of the Alps. Leaflets numerous, oval-oblong, acute, small, entire. Flowers in June, pink or purple, in dense heads with a leafy involucre as in the variety *atro-rubens.*

Culture &c. as above Increased by seeds or division.

A. Vulneraria (*Common Woundwort*). A pretty native perennial with silky stems 6–18 in. high, and pinnate leaves having 2–6 pairs of narrow oblong leaflets ½–1½ in. long. The flowers appear from June to August and are usually yellow in colour, but sometimes white as in the variety *alba*, or pink, or red. The variety *Dilleni* has creamy-coloured flowers with red tips.

Culture &c. as above. The common Woundwort is found growing naturally on dry rocky banks, and may be utilised for covering dry bare places in the rock garden.

SECURIGERA (Axe Weed; Hatchet Vetch).—A genus with only one species described below:—

S. Coronilla (*Coronilla Securidacea*). A rather pretty S. European annual 1 ft. high with oddly pinnate leaves and entire leaflets; stipules small, membranous. Flowers in July, yellow, nodding, at the tips of the axillary peduncles; petals free from the stamen tube; standard nearly round; wings oblique oblong; keel incurved, somewhat beaked. Stamens 10, upper one free. Pod linear, falcate, pointed, flatly compressed.

Culture and Propagation.— This species grows in ordinary soil, and requires only to be sown every spring where it is to bloom. Warm sunny places suit it best, either in the rockery or border.

DORYCNIUM. A genus with about 6 species of pretty smooth, downy or hairy herbs or undershrubs. Leaves 4–5-foliolate. Flowers in heads or rather umbellate, numerous. Calyx rather bell-shaped, lobes nearly equal. Petals free from the stamen tube; standard oval-oblong, contracted into a claw at the base; wings oboval-oblong, larger than the incurved, bluntish swollen keel. Stamens 10, upper one free. Pod oblong or linear, terete, or swollen.

Culture and Propagation.— These plants are easily grown in rather dry soil, and readily come from seeds sown outside either as soon as ripe, or in spring, afterwards transplanting the seedlings or thinning them out to allow sufficient space to develop properly. They may be grown in the rock garden in warm exposed situations.

D. hirsutum (*Lotus rectus*).—A hoary plant 1–2 ft. high, native of S. Europe. Leaves sessile; leaflets ovate, lance-shaped or obovate. Flowers in July, whitish, or pale red, large, in many-flowered heads.

Culture &c. as above.

D. suffruticosum (*Lotus Dorycnium*). A pretty S. European shrub 2–3 ft. high. Leaflets and stipules oblong lance-shaped, acute. Flowers in June, white, with a reddish keel.

Culture &c. as above. Other species met with are *D. herbaceum* and *D. latifolium*, both from S. Europe and with white flowers, and *D. rectum* from the same region with small rose-coloured ones.

LOTUS (Bird's Foot Trefoil).—A genus with 50 100 species of smooth, silky or hairy herbs or undershrubs. Leaves 4–5-foliolate. Stipules minute, tubercular, or none. Flowers on an axillary stalk, usually several in an umbel. Calyx lobes nearly equal. Petals free from the stamen-tube; standard obovate roundish, or ovate, pointed, contracted into a claw at the base; wings obovate; keel incurved or inflexed, beaked, swollen at the sides. Stamens 10, upper one free. Pod oblong or often linear, straight or curved, round, swollen or flatly compressed.

Culture and Propagation.— The species described below is the only one worth growing in the outdoor garden. It thrives in ordinary soil, and is easily raised from seeds sown in the open air as soon as ripe or in spring. Well suited for carpeting parts of the rockery.

L. corniculatus.— This is a British plant often seen in pastures, meadows &c. Leaflets obovate, acute, entire. Flowers in summer and autumn, bright yellow, fading to orange, 4–10 on a stalk; standard petal striped with red in front. The double-flowered variety is an improvement on the type.

PSORALEA.—A large genus of herbs, shrubs or undershrubs usually with leaves composed of 3–5 leaflets, and having the stipules adhering to the stalk. The flowers are borne in heads, spikes, racemes or fascicles, rarely solitary, and purple, blue, rosy or white in colour. Calyx lobes nearly equal, the 2 upper ones often united. Petals about as long as or shorter than the keel; standard ovate or round, contracted into a claw, or furnished with small inflexed auricles; wings oblong, somewhat sickle-shaped; keel blunt, incurved. Pod ovate, indehiscent.

P. glandulosa. — A rather pretty Chilian shrub 2–4 ft. high, with ternate leaves composed of ovate lance-shaped tapering leaflets. The white flowers, tinged with blue, are borne from May to September in spiked racemes, issuing from the axils of the upper leaves.

Culture and Propagation. — This species is rarely met with, but it is fairly hardy at Kew in warm positions and would no doubt be quite hardy in the mildest parts of the south and west. It will grow well in ordinary good garden soil, and may be increased by cuttings of the plump shoots in early summer, placed under a handlight or in a cold frame or greenhouse.

There are several herbaceous species to be met with chiefly in botanic gardens, viz. *bituminosa*, from South Europe; *macrostachya*, from California; and *Onobrychis* and *physodes* from the more northern parts of America.

AMORPHA (Bastard Indigo). — A genus with 8 species of smooth or downy shrubs or undershrubs. Leaves oddly pinnate with numerous glandular-dotted leaflets. Stipules small or none. Flowers densely spicate, racemose, terminal. Calyx lobes almost equal. Standard ovate, erect, contracted into a claw; wings and keel absent. Stamens 10, united. Pod short, long, sickle-shaped or crescent-shaped.

Culture and Propagation. — These plants thrive in ordinary garden soil, but require shelter in bleak localities. They may be increased by layers or cuttings, the latter being taken off at a joint and inserted in a sheltered place in sandy soil in autumn, allowing them to remain about a year. They should be protected with handlights during the winter months. Suckers, which are freely produced, may also be used to increase the plants.

A. canescens (*Lead Plant*).—A hoary-looking plant 3 ft. high, native of Missouri. Leaflets ovate-elliptic, sharply pointed. Flowers in July, dark blue.

Culture &c. as above.

A. fruticosa.—A smooth or slightly hairy species 6 ft. high, native of Carolina. Leaflets elliptic-oblong. Flowers in June and July, very dark bluish-purple or violet, with conspicuous yellow stamens. In catalogues will be found numerous so-called varieties of this species, but it is very difficult to distinguish one from another. Indeed in the Kew Handlist of Trees and Shrubs as many as 15 distinct synonyms are given for this species.

Culture &c. as above.

PETALOSTEMON (Prairie Clover).—A genus with 14 species of usually perennial, glandular, dotted herbs with oddly pinnate leaves. Stipules minute, bristly. Flowers in heads or terminal spikes, or opposite the leaves, often stalked. Calyx lobes nearly equal. Standard, with a free slender claw, heart-shaped or oblong, concave or cup-like. Stamens 5, united at the base. Pod, including the calyx, membranous.

Culture and Propagation. — The following species are best known but are not very much cultivated. They thrive in sandy loam with a little peat or leaf mould, and may be increased by dividing the rootstocks in spring.

P. candidus. — A N. American perennial, 1 ft. high. Leaflets 7–9, lance-shaped or linear oblong. Flowers in July, white, in oblong or cylindrical heads.

Culture &c. as above.

P. violaceus. — Also a N. American perennial 1 ft. high, leaflets 5, narrow, linear. Flowers in July, rosy-purple, in globose, ovoid, or oblong-cylindrical heads.

Culture &c. as above.

INDIGOFERA (Indigo).—A genus with over 200 species of herbs or undershrubs. Leaves oddly or evenly pinnate, rarely digitately 3-foliolate. Flowers in axillary racemes or spikes. Calyx lobes small, nearly equal. Standard ovate or roundish; wings oblong, slightly cohering to the straight blunt or pointed keel. Stamens 10, upper one free. Pod globose, oblong or linear, straight, arched, or rarely crosier-like.

I. decora.—A pretty evergreen shrub 1–3 ft. high, native of China and Japan. The pinnate leaves are composed of 2–6 pairs of bluntly ovate mucronate leaflets, and the reddish flowers are produced during the early summer months in crowded racemes. The variety *alba* has white flowers.

Culture and Propagation. — This species was once generally cultivated in greenhouses, but it has been proved fairly hardy out of doors in the neighbourhood of London. It grows better, however, in the milder parts of the south and west in warm and sheltered places. It will grow in loamy soil and leaf mould, and may be increased by seeds and cuttings in the same way as *I. gerardiana.*

I. gerardiana (*I. floribunda*). — A pretty Himalayan low branching shrub with shortly stalked pale grey-green leaves, glaucous and hoary beneath. Flowers in July, purple-pink, 10–20 on an erect raceme. Seeds are ripened freely.

Culture and Propagation.—This may be grown as a bush or against a wall, and in bleak districts may require protection in winter. It thrives in loamy soil with leaf mould, and is easily raised from seeds sown under glass; or may be increased by cuttings of the young shoots in sandy or peaty soil. It is an excellent plant for massing boldly in beds on the grass.

GALEGA (Goat's Rue).—A genus with 3 species of smooth, erect, ornamental perennial herbs. Leaves oddly pinnate; leaflets entire, veined. Stipules somewhat arrow-shaped. Flowers in axillary and terminal racemes. Calyx teeth nearly equal. Standard petal obovate-oblong, with a short, narrow claw; wings oblong, slightly adhering to the somewhat incurved, blunt keel. Stamens 10, united. Pod linear, roundish, pointed.

Culture and Propagation.—Galegas like a rich, loamy soil and sunny situations, and will flower year after year if left undisturbed. It is advisable, however, either to divide them, say, every third or fourth year, or to give them fresh soil. They may be increased by dividing the rootstocks in early autumn or in spring, the latter season being perhaps better on the whole; or by sowing seeds in the open border in spring. Cuttings of the non-flowering shoots may be inserted in cold frames during the summer months and kept close for a time.

Galegas are very useful and ornamental plants for massing in the flower border or even in beds by themselves.

G. officinalis (*Common Goat's Rue*).—A native of South Europe, 3–5 ft. high. Leaves lance-shaped, smooth, sharply pointed; stipules broadly lance-shaped. Flowers in summer, blue, in dense clusters. The variety *albiflora* (or *G. persica*) is a very handsome plant with white flowers, and *bicolor* has white and blue flowers.

Culture &c. as above. By pinching off the withering flowers and thus preventing the development of seeds, the plants often flower a second time in autumn; but this is a strain on them.

G. orientalis.—A Caucasian perennial, 2–4 ft. high, with creeping roots and simple flexuous stems. Leaves ovate, pointed, smooth; stipules broadly ovate. Flowers in summer and autumn, blue, in more or less erect clusters.

Culture &c. as above.

WISTARIA (Grape-Flower Vine; Shoes and Stockings).—A genus with 4 or 5 species of high-climbing, deciduous shrubs, with oddly pinnate leaves, small stipules, and drooping terminal racemes. The 2 upper teeth of the calyx short and somewhat united; the 3 lower ones longer. Standard petal large; wings oblong sickle-shaped, usually free from the blunt, incurved keel. Stamens 10, the upper one free or united with the others near the middle. Pod elongated, alternately swollen and constricted.

Culture and Propagation.—Wistarias—especially the common one—grow in almost any soil, and flower profusely for many years without the slightest attention to roots or soil. They are easily increased by layering the young shoots in summer, and cutting them away the following spring. Cuttings will root only with great difficulty, and grafting a shoot on to the roots is sometimes practised; but neither of these methods is an improvement on the easier operation of layering.

For covering the walls of houses, arbours, trellises &c. the value of the Wistaria is well known. Grown as a standard with the branches creeping or trained to a framework, the plants look very effective on lawns when clothed with their weeping trusses of delicate blossoms. Of the species described below, the common *Wistaria chinensis* is undoubtedly the finest and most useful, and it is never likely to be supplanted as one of the most ornamental woody climbers in cultivation.

If uncared for, the branches and stems in a few years become inextricably tangled. To prevent this they should be looked over carefully once a year, cutting out such branches as are not wanted, and training others to fill up gaps as may be required.

W. brachybotrys.—A tortuous Japanese shrub 3–5 ft. high. Leaflets truncate or rather heart-shaped at the base, ovate lance-shaped, pointed, silky, hoary on both sides. Flowers in April, violet-purple, in short erect or loosely spreading clusters.

Although known for many years this is still a very rare plant, and only small specimens are to be met with in cultivation. There is a white-flowered variety *alba* also known.

Culture &c. as above.

W. chinensis (*W. sinensis; W. consequana; Glycine chinensis; G. sinensis*). *Chinese Kidney Bean Tree.*—A beautiful Chinese climbing shrub, with ovate-pointed leaflets in opposite distant pairs, covered with a thin silky down. Flowers from April to June, before the leaves are fully developed, pale purple, in long conical clusters, and in great abundance. There is a pure white-flowered variety called *alba*, and a double-flowered form, *flore pleno*; *macrobotrys* has white flowers tinted with bluish-purple, in very long clusters; and *variegata* has silver and green foliage, but it and *flore pleno* are not particularly handsome.

Culture &c. as above. This is one of the few cases where the botanical name has found popular favour, and the Wistaria is probably one of the best known plants in cultivation. It is invaluable for covering houses and buildings of all kinds, and if the branches are trained round the various sides, thus securing different aspects, the period of flowering can be considerably lengthened. Thus the shoots on a north wall will be in bloom 2 or 3 weeks even after those on a south wall have faded. In August and September again, it is not unusual for healthy plants to come into blossom anew, but the flowers are not in such great profusion as in the earlier part of the year.

W. frutescens (*Glycine frutescens; Thyrsanthus frutescens*). — *American Kidney Bean Tree.*—A handsome deciduous N. American climber. Leaflets 9–13, 1 in. long, ovate lance-shaped or oblong. Flowers later than *W. chinensis*, dark blue, violet-tinted, in clusters 4–6 in. long. *Magnifica* is an improved form with flower racemes over 1 ft. long. There is also a variety *alba* with white flowers, but otherwise similar to the type.

Culture &c. as above.

W. japonica. — A smooth Japanese shrub. Leaflets shortly stalked, ovate lance-shaped, blunt or acute. Flowers in summer, white, in simple nodding racemes. This species may be grown as a bush, in which state it shows little tendency of a climbing nature. It is also known as *Millettia japonica.*

Culture &c. as above.

W. multijuga (*W. grandiflora*). — A beautiful Japanese species with pinnate leaves, and numerous elliptic-ovate, pointed leaflets. Flowers in summer, pale lilac-purple, with purple wings and keel, individually smaller than those of *W. chinensis*, but in racemes often 2–3 ft. long.

Culture &c. as above.

ROBINIA (LOCUST TREE).—A genus with 5 or 6 species of clammy or bristly deciduous trees or shrubs, with oddly pinnate leaves, bristly or spiny stipules, and flowers in axillary racemes. Calyx teeth short, broad. Standard petal large, reflexed; wings sickle-shaped, oblong, free; keel incurved, blunt. Stamens 10, the upper one usually free to the base, or united with the others midway. Pod linear, flatly compressed.

Culture and Propagation. — Robinias grow well almost everywhere, except in stagnant wet soil, and from the spring to late autumn are very ornamental in appearance. They may be increased by layers when obtainable, or the rarer kinds by grafting or budding on *R. Pseudacacia.* Seeds will also germinate fairly well, especially if soaked in hot water for a few hours previous to sowing. Cuttings of the roots may also be inserted in sandy soil in gentle bottom heat in the early spring months.

R. dubia (*R. ambigua; R. echinata*). A supposed hybrid between *R. Pseudacacia* and *R. viscosa.* It is a pretty tree about 25 ft. high, with ovate leaflets. Flowers from June to August, pale rose, sweet-scented, in loose drooping racemes, followed by brown pods thickly beset with prickles.

Culture &c. as above. This is also

known as *bella-rosea*, and is regarded as a variety of *R. Pseudacacia*.

R. hispida (*Rose Acacia*).—A beautiful N. American shrub 5–15 ft. high, with more or less bristly branches and stalks. Leaflets 11–18 on a rachis, smooth, ovate, or oblong ovate, tipped with a long bristle. Flowers in early summer, deep rose, large, scentless, in drooping racemes. Pods glandular hairy. The variety *macrophylla* has larger ovate roundish leaflets, and smooth branches and flower stalks without prickles, a fact which has also earned for it the name of *inermis*.

Culture &c. as above. This species is generally grafted on stocks of *R. Pseudacacia*, but it may also be increased by root cuttings. Although it flowers profusely, it rarely ripens any seeds in the British Islands. Plants only 2–4 ft. high flower well.

R. neo-mexicana. — This beautiful small tree or large shrub is a native of Colorado, New Mexico, and Arizona, and sometimes attains a height of 20–25 ft. in a wild state. It has not been many years in cultivation, but has proved to be quite hardy, and there are now specimens at Kew about 15 ft. or more high. The young shoots and the under surface of the young leaflets are covered with brownish hairs, while the fully developed oblong leaflets, each about 1½ in. long, are of a soft bluish-green on the upper surface. The pretty deep rose-coloured flowers appear during the summer months in short drooping racemes about 6 in. long. Seeds are ripened freely, and are enclosed in pods covered with bristly brown hairs.

Culture &c. as above.

R. Pseud-acacia (*False Acacia; Common Locust*). — A handsome, hard-wooded N. American tree, 30–60 ft. high, with naked branches. Leaflets 9–18, oblong ovate or elliptic. Flowers in April and May, white, fragrant, in slender, loose, drooping clusters, 3–5 in. long. Pods smooth. The first plant of the Common Locust introduced to Europe in 1637 still exists in the Jardin des Plantes at Paris, but the main branches and trunk have been much broken, not unnaturally after more than 260 years.

There are many varieties, such as :—

Bessoniana, a compact, round-headed tree with thornless branches.

crispa, with nearly all the leaflets waved or curled.

Decaisneana, with bright rosy-pink flowers.

fastigiata, similar in growth to the Lombardy Poplar.

inermis, small-growing, round-headed bush, usually grafted on upright stems of the Common Locust, and often seen growing in small villa gardens.

macrophylla, leaves long, leaflets broad.

microphylla, leaves small, leaflets narrow.

monophylla, leaves reduced to a single leaflet or sometimes two.

monstrosa, leaves large and twisted.

pendula, shoots slightly drooping.

procera, tall, strong-growing.

semperflorens, lasts in flower throughout summer.

sophoræfolia, leaves large, like those of *Sophora japonica*.

stricta, a variety with a tendency to grow erect.

tortuosa, branches curiously twisted.

umbraculifera, leaflets ovate; branches much crowded, smooth ; head rounded.

The characters of other varieties such as *aurea*, *revoluta*, *angustifolia elegans*, *linearis*, are indicated by the names.

Culture &c. as above. The False Acacia is one of the most graceful hardy trees grown, not so much for its drooping masses of white flowers, but for the light and feathery appearance of its soft green luxurious foliage. For large gardens and parks it is very valuable, and although perfectly hardy, should always be planted in spots sheltered from tempestuous winds. This is necessary chiefly because of the brittleness of the wood, which in old trees especially is readily rent by violent storms. Seeds are ripened freely.

R. viscosa (*R. glutinosa*).—*Clammy Locust.*—A N. American tree 20–40 ft. high. Leaflets 11–15, ovate and oblong, blunt, or slightly cordate at the base, paler and downy beneath, tipped with a short bristle. Flowers in May and June, rosy, in crowded, roundish, erect racemes. Pods glandular, viscid.

Culture &c. as above. Although not such a free grower as the False Acacia, the Clammy Locust is nevertheless a desirable ornamental tree. It is easily recognised not only by its rosy flowers but also by the clamminess of the young shoots and leaf stalks. It ripens seeds freely.

NOTOSPARTIUM.—A genus containing only the one species here described with the generic characters :—

N. Carmichaeliæ.—A very interesting and rather ornamental tree, native of New Zealand. It grows about 20 ft. high in well-favoured localities and is easily recognised by its slender branches and drooping thong-like shoots which are destitute of leaves. The rather small pink or rosy flowers are borne during the summer months in racemes at the sides of the twigs, and give the plant a distinct and attractive appearance, resembling some of the Brooms. Calyx teeth short, nearly equal. The standard petal roundish, contracted at the base into a very short claw; wings oblong sickle-shaped, free; keel incurved, blunt. Stamens 10, the upper one free. Pod linear, flatly compressed.

Culture and Propagation. — This singular plant proves to be hardy out of doors in ordinary winters in the neighbourhood of London. It likes warm and sheltered situations fully exposed to the sun, and will flourish in ordinary good and well-drained garden soil, or a mixture of sandy peat and loam. It produces seeds freely and may be increased by this means. The seeds may be sown in cold frames as soon as ripe or in spring; cuttings of the ripened shoots will also root in sandy soil under the protection of a handlight.

CLIANTHUS (Glory Pea; Parrot Beak). — A genus of smooth or hairy climbing herbs or undershrubs with many-foliolate leaves, herbaceous stipules, and flowers in short, drooping, axillary racemes. Calyx teeth almost equal, the 2 upper ones broader at the base. Standard petal pointed, reflexed, longer than the falcate lance-shaped wings; keel straight or incurved, acute. Stamens 10, upper one free. Pod swollen, oblong, pointed, incurved.

C. Dampieri (*Glory Pea*).—A beautiful Australian species about 2 ft. high, with neatly winged, silver-grey, hairy leaves, and drooping clusters of large red flowers 5 or 6 on a stalk, with a blackish or dark purple blotch at the base of the standard petal. The variety *marginatus* has white flowers bordered with red, and a black blotch at the base of the standard.

Culture and Propagation. — This plant unfortunately is not quite hardy even in the mildest parts of the British Islands and should be slightly protected in winter. Rich loamy soil and hot sunny positions suit it best. It may be raised from seeds sown under glass in gentle bottom heat, or may be increased from cuttings of the young shoots put in sandy soil under glass during the spring and early summer months.

C. puniceus (*Parrot's Bill*).—A brilliant New Zealand silky-haired species 6–10 ft. high. Leaflets alternate, oblong, leathery, retuse. Flowers in summer, scarlet, freely produced, with a large, boat-shaped, long-beaked keel. *Magnificus* is a strong-growing variety much hardier than the type. A writer in the 'Gardeners' Chronicle' some years ago referred to a plant he grew on a south wall. It was 14 ft. high and had upwards of a thousand flowers all fully expanded at one time. The plant was killed down within 3–4 ft. of the ground in winter, and although two seedlings from it flowered and seeded in the open air in summer, they were both killed the succeeding winter. On the south-west coast of Scotland this variety seems to be hardy in ordinary winters.

Culture &c. The treatment of this species is the same as for *C. Dampieri.* Both species are very remarkable and beautiful when well grown, but it often happens that with the greatest care and the best cultural skill the plants fail to give an adequate return for the trouble bestowed upon them.

COLUTEA (Bladder Senna). — A genus containing 7 or 8 species of smooth or somewhat silky-downy shrubs, with oddly pinnate leaves, small stipules and flowers in axillary racemes. Calyx teeth nearly equal. Standard petal roundish; wings sickle-shaped oblong, short-clawed; keel broad, much incurved, blunt, with long united claws. Stamens 10, upper one free. Pod stalk papery, inflated, or bladder-like, and forming the main character of the genus.

Culture and Propagation.—Coluteas grow readily in any ordinary soil and in any situation, and may be increased from seeds sown as soon as ripe or in spring in warm sheltered spots out of doors; or cuttings of the more or less ripened shoots inserted in sandy soil in autumn will root freely under a handlight, and may be transplanted during mild weather the following spring.

C. arborescens.—A native of Central and S. Europe 6-10 ft. high. Leaflets elliptic, depressed at the tips. Flowers from June to August, yellow, about 6 on a stalk. This species is said to grow on the Vesuvian crater. The variety *pygmæa* (or *crispa*) is a dwarf form with curled leaves.

Culture &c. as above.

C. cruenta (*C. orientalis; C. sanguinea*).—A native of S.E. Europe, 4–6 ft. high. Leaflets 7–9, glaucous. Flowers in summer, reddish-yellow, 3–5 on a stalk. *C. media* is very similar but has orange-yellow flowers.

Culture &c. as above.

C. halepica.—A native of the Levant 3–6 ft. high. Leaves glaucous, with small, numerous leaflets. Flowers in summer, yellow, larger than those of the other species. This plant is also known as *C. istria.*

Culture &c. as above.

HALIMODENDRON (Salt Tree). A genus with only one species described herewith:—

H. argenteum (*Robinia Halodendron*). — A pretty shrub 4–6 ft. high, native of Asiatic Russia, with abruptly pinnate, silky, whitish leaves, having 2 pairs of leaflets, the main leaf stalk ending in a spine. Flowers from May to July, purplish, rather large, umbelled, axillary, or clustered on the old knots. Calyx gibbous behind, with short teeth. Standard roundish, folded at the edges; wings falcate-oblong, free; keel incurved, obtuse. Stamens 10, upper one free. Pod ovoid or oblong, much inflated, thickish, leathery.

Culture and Propagation.—The Salt Tree thrives in sandy soil and may be increased by seeds, cuttings, or layers. It is often grafted upon the common Laburnum and the Caragana and grown as a standard tree simply because seedling plants on their own roots often perish if placed in positions where the young stems are not much protected from keen cold winds. Once the stems have become well-ripened and woody, there is not so much danger of the plants dying. Under favourable conditions it is a handsome plant, the drooping clusters of purplish flowers being in strong contrast to the silvery white or grey of the foliage.

CARAGANA (Siberian Pea Tree). A genus with 15 species of ornamental trees or shrubs with abruptly pinnate leaves, awl-shaped, spiny, or minute stipules, and axillary, solitary or crowded flowers, always on slender stalks. Calyx somewhat gibbous, teeth nearly equal. Standard petal ovate or roundish, folded at the sides, with a narrow claw; wings oblique, oblong, free; keel rather straight, obtuse. Stamens 10, upper one free. Pod sessile, linear, round or swollen.

Culture and Propagation.—Caraganas thrive in sandy soil, and are suitable for shrubberies. They may be raised from seeds, or increased by cuttings of the roots. and by layers. They are frequently grafted on *C. arborescens*, which is raised from seed sown as soon as ripe or in early spring.

Although not of the highest merit from a decorative point of view, the Caraganas nevertheless may be given a place in large gardens on account of their rather graceful habit, their perfect hardiness, and the fact that most of them will flourish in almost any poor soil.

C. arborescens. — A Siberian tree 15–20 ft. high. Leaflets 4–6 pairs, oval oblong, hairy; stipules spiny. Flowers in April and May, pale or bright yellow, in clusters, each flower having a slender stalk about 1 in. long. There are several varieties, the best being *nana*, which is a dwarf compact shrub with gnarled and knotted branches, the leaves and flowers, however, being similar to those of the type; *pendula*, as the name indicates, is a weeping variety and is usually grafted on tall stocks of the typical *C. arborescens* so that the branches may hang down more or less vertically; *Redowski* is remarkable for its long flexuous usually unbranched stems and its free-flowering character.

Culture &c. as above.

C. aurantiaca. — A comparatively recent introduction from Central Asia. It grows 3–4 ft. high and is closely related to *C. pygmæa*, but may be distinguished from that species by its larger and more distinctly lobed calyx and more pointed linear leaflets, of which latter there are 2 pairs issuing from the axil of a triple spine. The deep orange-yellow flowers hang down from the branches in great profusion in May and June and have a very ornamental appearance.

Culture &c. as above. Like most of the other species seeds are produced freely but the plants are usually grafted.

C. Chamlagu.—An ornamental shrub readily recognised by its deep glossy green leaves which are composed of 2 pairs of smooth obovate leaflets ½-1½ in. long, the outer pair being the larger. The rather large yellow flowers appear in early summer, one to each stalk, and as they begin to fade assume a reddish tint.

Culture &c. as above. This species is rarely or never seen on its own roots. It is usually grafted on standard stocks of *C. arborescens* about 4–5 ft. high, and assumes a drooping bushy habit that is very graceful.

C. frutescens.—A Siberian shrub 2–8 ft. high. Leaflets 2 pairs, obovate wedge-shaped, leaf stalk tipped with a short spine. Flowers in April, yellow, on twisted stalks. The variety *angustifolia* may be recognised by its narrow wedge-shaped leaflets ending in a point.

Culture &c. as above.

C. jubata (*Robinia jubata*). — A native of Siberia 1–2 ft. high. Leaflets 4–5 pairs, oblong lance-shaped, fringed with woolly hairs. Flowers in April, white or tinged with red, on very short stalks.

Culture and Propagation.—This remarkable species is readily recognised by its woolly bark and bristly stipules. It is not so amenable to cultivation as the other species, and is best grown near a south wall in dry sandy soil. It may be raised from seeds sown in cold frames when ripe, but the young plants should be well hardened off and be of a good sturdy growth before they are transferred to the open ground. It may also be grafted like the other species.

C. microphylla (*C. Altagana*). — Native of Dahuria 2–8 ft. high, with long slender graceful branches. Leaflets in 6–8 pairs, smooth, obovate roundish, retuse, about ¼ in. long. Flowers from April to July, yellow, solitary.

Culture &c. as above.

C. pygmæa.—A graceful shrub about 3 ft. high, with long slender branches and a rather straggling or drooping habit. It exists in a wild state from the Caucasus to the Himalayas. The leaves are very closely arranged on the stems, and each one is composed of 2 pairs of small narrow leaflets about ½ in. long. The drooping bright yellow flowers appear in May and June, and seeds are in due course also freely produced.

Culture &c. as above.

C. spinosa.—Native of Siberia 4–6 ft. high. Leaflets 2–4 pairs, wedge-shaped linear, smooth; stipules spiny; old leaf stalks strong, persistent, spiny. Flowers in April and May, yellow, nearly sessile.

Culture &c. as above.

CALOPHACA.—A genus with 6 or 7 species of woolly or smooth perennial herbs or undershrubs, with characters similar to Caragana.

C. wolgarica.—A Siberian deciduous shrub 2–3 ft. high, with 6–7 pairs of roundish leaflets, velvety beneath, racemes of yellow flowers in May and June, followed by beautiful reddish pods.

Culture and Propagation. — This species is the one usually grown and is useful for the shrubbery. The seeds are produced in abundance in fine seasons, and plants may be raised from them. It is often grafted on tall stems of the Laburnum and looks very effective in bloom.

ASTRAGALUS (Milk Vetch).—A genus containing more than 600 species of dense, very much branched, often spiny, annual or perennial herbs or undershrubs, most of them useless from a garden point of view. Calyx tubular, 5-toothed. Petals often long-clawed; standard erect, ovate oblong, or fiddle-shaped; stamens 10, upper one free. Pod sessile or stalked.

Culture and Propagation.—The Milk Vetches grow well in any light dry soil, and may be increased by dividing the roots, by seeds, or in the case of shrubby sorts also by cuttings in a cold frame. The seeds are usually a long time sprouting and are best sown as soon as ripe in pots or pans under glass. The plants may be used for the decoration of the rock garden in the somewhat rougher parts, or massed in rougher parts of the garden in dry soils. Besides the species referred to below there are many others to be met with in botanic gardens.

A. adsurgens.—A somewhat rare and handsome smoothish Siberian perennial, with 11–12 pairs of ovate lanceolate acute leaflets. Flowers in June, bluish-purple, densely packed on oblong spikes.

Culture &c. as above.

A. aduncus.—A Caucasian perennial 6–9 in. high. Leaflets in numerous pairs, roundish-ovate, smooth, downy. Flowers in summer, rose-purple, in oblong spikes.
Culture &c. as above.

A. alopecuroides.—A fine erect Siberian perennial 2–5 ft. high. Leaflets numerous, ovate-lance-shaped, downy; stipules similar, pointed. Flowers in June, yellow, densely crowded.
Culture &c. as above.

A. arenarius.—A whitish-hairy Danish perennial about 6 in. high. Leaflets linear, blunt; stipules united opposite the leaves. Flowers in June, blue.
Culture &c. as above.

A. austriacus. — A spreading procumbent European perennial. Leaflets smooth, linear, truncately emarginate. Flowers in May, purple, with a blue standard.
Culture &c. as above.

A. canadensis. — A rather hairy Canadian perennial 2–3 ft. high, with 10–12 pairs of elliptic-oblong, bluntish leaflets. Flowers in July, yellow.
Culture &c. as above.

A. dahuricus.—An erect, hairy, Siberian perennial 1–2 ft. high, with 7–9 pairs of oblong, mucronate leaflets. Flowers in July, purple, in dense racemes.
Culture &c. as above.

A. dasyglottis.—A charming spreading Siberian alpine perennial 3–4 in. high. Leaflets elliptic-oblong, rather emarginate; stipules united, opposite the leaves. Flowers in June, purple, blue, and white, mixed.
Culture &c. as above.

A. falcatus (*A. virescens*).—An erect, hairy perennial 1–2 ft. high, native of wet, grassy places in Siberia. Leaflets 16–20 pairs, elliptic-oblong acute. Flowers in June, greenish-yellow, in spikes.
Culture &c. as above.

A. galegiformis.—A striking Siberian perennial 3–5 ft. high, with 12–13 pairs of elliptic-oblong leaflets. Flowers in June, pale yellow, in drooping racemes.
Culture &c. as above.

A. Glyciphyllus.—A British perennial with stout, prostrate, zigzag stems 2–3 ft. long. Leaflets 5–7 pairs, oval, blunt, smooth; stipules ovate lance-shaped, entire. Flowers in June, sulphur-yellow.
Culture &c. as above.

A. hypoglottis (*A. danicus*).—A hairy prostrate British perennial, 3 in. or more high. Leaves 2–4 in. long, with numerous small, oblong linear, blunt, deep green leaflets. Flowers in summer, bluish-purple, in round heads. The variety *albus* differs only in having white flowers.
Culture &c. as above.

A. leucophyllus. — A N. American perennial 2–3 ft. high. Leaflets in numerous pairs, broadly linear, covered with soft silky down. Flowers in summer, pale yellow, in dense racemes.
Culture &c. as above.

A. maximus. — A handsome erect Armenian perennial 2–3 ft. high. Leaflets ovate lance-shaped, downy; stipules oblong lance-shaped. Flowers in June, yellow, in cylindrical sessile spikes.
Culture &c. as above.

A. monspessulanus. — A beautiful vigorous evergreen trailing perennial, stems 18 in. long, with 10–20 pairs of ovate acute, hoary leaflets. Flowers in June, pale rosy-lilac with bars of white on the standard petals, in racemes 2–5 in. long.
Culture &c. as above.

A. onobrychioides. — A handsome Persian perennial 9–12 in. high, with 8–10 pairs of elliptic leaflets, and united stipules opposite the leaves. Flowers in July, bright purple.
Culture &c. as above.

A. Onobrychis.—An elegant more or less trailing perennial, native of Central and S. Europe, with stems about 18 in. long, and 7–16 pairs of oblong leaflets. Flowers in June, purple. There are several white-flowering varieties, of which *alpinus* is the one best known.
Culture &c. as above.

A. pannosus. — A pretty Siberian perennial 6–9 in. high, with 4–9 pairs of ovate lance-shaped leaflets, and compact rounded heads of rosy flowers in July.
Culture &c. as above.

A. ponticus.—A rather hairy-stemmed vigorous perennial 2–3 ft. high, native of Tauria and Bessarabia, with oblong, smoothish leaflets, lance-shaped stipules, and yellow heads of flowers in July.
Culture &c. as above.

A. sulcatus. — A smooth Siberian perennial with furrowed stems 2–3 ft. high, and linear lance-shaped leaflets.

Flowers in July, pale violet, with a white keel tipped with brown.

Culture &c. as above.

A. Tragacantha (*Great Goat Thorn*). An evergreen spiny shrub 1½–3 ft. high, native of the Levant. Leaves hoary, with 7–9 pairs of linear, hairy leaflets; stalks becoming spiny when old. Flowers in June, pale violet, 2–5 together in the axils of the leaves. It was at one time erroneously thought that Gum Tragacanth was obtained from this plant.

Culture &c. as above.

A. vaginatus.—A handsome Siberian perennial 1 ft. high, with 7 or 8 pairs of elongated oblong leaflets covered with short silvery hairs. Flowers in summer, rosy-purple, with white-tipped wings, in dense spikes. Calyx rather inflated, covered with soft white and black hairs.

Culture &c. as above.

A. vesicarius. — A perennial hoary trailer 6–12 in. high, native of France. Leaflets 5–7 pairs, elliptic. Flowers in July, standard petal purple, wings yellow, keel white tipped with yellow. Calyx covered with black down and long white hairs.

Culture &c. as above.

A. vimineus. — A very handsome Siberian perennial 6–12 in. high, with 4–6 pairs of lance-shaped acute leaflets covered with adpressed hairs. Flowers in June, standard petal purple-rose, longer than the pure white wings. Calyx covered with black hairs.

Culture &c. as above.

A. vulpinus. — A pretty smooth-stemmed Caucasian perennial 2–3 ft. high, with obovate blunt, rather velvety leaflets. Flowers in June, pale yellow, in almost globose spikes.

Culture &c. as above.

OXYTROPIS.—A genus with 100 species of much-branched herbs or undershrubs, with the habit and floral characters of *Astragalus*, from which it differs chiefly in the flowers having a mucronate or pointed keel. Leaves oddly pinnate. Stipules adnate to the leaf stalk or free. Flowers in axillary spikes or racemes.

Culture and Propagation. — These plants prefer a dry, sandy, loamy soil, but are not particular so long as they are not in stagnant, moist spots. They are increased by seeds sown in the open border or by division of the plants in spring, and may be utilised for the rougher parts of the rock garden.

O. campestris.—A pretty Scotch alpine 3–6 in. high, with many pairs of lance-shaped acute, hoary leaflets. Flowers in July, creamy-white with purple-tinted wings and keel, scapes hairy, crowded.

Culture &c. as above.

O. fœtida.—A clammy, smelling plant 4–6 in. high, native of S. France, with many pairs of smooth lance-shaped linear leaflets, and creamy-white flowers in July.

Culture &c. as above.

O. Halleri.—An elegant Scotch silky-haired species 6 in. high, with ovate acute leaflets and rich bluish-purple, or rarely white, flowers in July, in round dense heads.

Culture &c. as above.

O. Lamberti.—A rare and beautiful stemless rock plant 6–12 in. high, native of N. America, with silky and hairy lance-shaped acute leaflets. Flowers in August, rosy-carmine.

Culture &c. as above.

O. montana. — A hairy European species 6 in. high, with elliptic lance-shaped leaflets and short racemes of bluish-purple flowers in summer.

Culture &c. as above.

O. pilosa (*Astragalus pilosus*). — A pretty softly hairy Siberian species about 6 in. high, with lance-shaped acute leaflets and pale yellow flowers in July.

Culture &c. as above.

O. pyrenaica.—A handsome Pyrenean species 4–6 in. high, with lance-shaped or oblong pointed leaflets covered with long silky hairs. Flowers in summer, sky-blue, erect, 9–15 on a short crowded raceme. Calyx very hairy, with short lance-like teeth.

Culture &c. as above.

O. uralensis.—A pretty Scotch and European perennial with 10–15 pairs of ovate acute leaflets, and dense round heads of bright purple flowers in summer. Very similar to *O. campestris.*

Culture &c. as above.

CORONILLA.—This genus contains about 20 species of smooth rarely silky herbs or shrubs, with oddly pinnate leaves, and flowers on long-stalked axillary umbels. Calyx teeth nearly equal, 2 upper ones united. Petals rather long-clawed; standard roundish; wings obliquely obovate or oblong; keel incurved, beaked. Stamens 10, upper one free. Pod round, 4-angled or slightly compressed, straight or curved.

Culture and Propagation.—The hardy Coronillas may be increased by cuttings inserted in sandy soil in a cold frame or greenhouse in spring. The roots may also be divided. Seeds if sown as soon as ripe will give a fair percentage of good seedlings. They thrive in a mixture of good loam and peat, and are excellent for the rougher parts of the rockery, the margins of shrubberies, or the front of mixed borders. *C. glauca*, a lovely greenhouse plant with glaucous foliage and yellow flowers, may be grown outside in the very mildest parts of the country.

C. Emerus (*Scorpion Senna*).—An elegant S. European shrub 3–6 ft. high, with 5–7 obovate leaflets, and yellow flowers in April, 3–5 on a stalk. In mild winters the leaves may remain on the plant.

Culture &c. as above. Increased by seeds or cuttings.

C. iberica.—A pretty prostrate rock plant, with more or less ascending stems 6–8 in. high, and 9–11 obcordate, ciliate leaflets; stipules distinct, roundish, toothed. Flowers in July, yellow, large, 7–8 in an umbel. This species is also known as *C. cappadocica*, and is a native of Asia Minor.

Culture &c. as above. Increased by seeds or division.

C. juncea.—A pretty rush-like shrub 2–3 ft. high, native of S. Europe. The round whip-like branches are sparingly furnished with leaves which are composed of 3–7 bluntly linear lance-shaped leaflets of a rather fleshy texture. The bright yellow flowers appear in June 5–7 in a cluster at the sides of the branches.

Culture &c. as above. This species is fairly hardy in the neighbourhood of London in ordinary winters. It should be grown in a sunny sheltered situation.

C. varia.—A pretty European species with trailing stems often 4–5 ft. long, and 11–13 oblong elliptic mucronate leaflets. Flowers from June to November, pink and white, or rarely white, 16–20 in an umbel.

Culture &c. as above. This species likes a somewhat chalky soil, and may be used for trailing over rocks in the rock garden. Seeds may be sown in the open air in April and May, or as soon as ripe in cold frames. In the latter case the seedlings may be transplanted the following spring.

HIPPOCREPIS (Horseshoe Vetch).—A genus with about 12 species of usually smooth spreading herbs or undershrubs with oddly pinnate leaves, and flowers in axillary stalked umbels. Petals long-clawed; standard roundish; wings falcate, obovate or oblong; keel incurved, beaked. Stamens 10, upper one free. Pod compressed, or rarely round, often curved, breaking up into 3–6 horseshoe-like joints.

H. comosa. — A British, European, and N. African plant with trailing stems, 6 in. long, and 7–15 obovate obtuse leaflets. Flowers in spring and summer, yellow, 5–8 in an umbel.

Culture and Propagation. — This plant grows easily in ordinary soil and may be increased by seeds sown in spring in the open air, or in autumn as soon as ripe; or division of the roots may also be practised in autumn and spring. The plants are suitable for the rockery or border.

HEDYSARUM. — A genus with 50 species of smooth, hoary or silky-haired perennial herbs or undershrubs, with oddly pinnate leaves and flowers in axillary racemes. Standard obovate or obcordate, narrowed at the base, scarcely clawed; wings oblong, sometimes very short; keel obliquely truncate. Stamens 10, upper one free. Pod flattened with rounded or quadrate joints.

H. coronarium (*French Honeysuckle*).—A pretty S. European perennial 3–4 ft. high, with 3–5 pairs of elliptic or roundish leaflets, downy beneath. Flowers in summer, deep red, in crowded spikes or racemes. There is a variety with white flowers.

Culture and Propagation. — This species grows freely in ordinary garden soil, and reproduces itself from self-sown seed, in favourable sunny spots in deep soil. In cold parts of the kingdom it may be advisable to give a little protection in winter with dry leaves &c. during severe weather. There are several other species grown in botanical collections.

H. Mackenzi. — A rather handsome N. American perennial 2–3 ft. high, the pinnate leaves of which are made up of 5–7 pairs of oval, blunt, or retuse leaflets. The pretty rose-purple flowers appear in early summer in long loose racemes.

Culture &c. as above for *H. coronarium.* Seeds are freely ripened.

H. microcalyx.—A pretty half shrubby perennial 2–5 ft. high, native of the N.W. Himalayas. The pinnate leaves are 6–12 in. long, and composed of 17–21 oblong blunt leaflets each ¾–1½ in. long. The bright purple flowers appear in June in racemes 6–12 in. long.

Culture &c. as for *H. multijugum.*

H. multijugum.—A shrub 2–5 ft. high native of S. Mongolia. The plant is covered with soft silky hairs, and the leaves are composed of 20–30 bluntly obovate or oblong leaflets, silky beneath. The pale pinky-red flowers appear in early summer and are borne in racemes in the axils of the leaves.

Culture and Propagation. — This species produces seeds freely in the open air, and new plants may be obtained by sowing them as soon as ripe or in spring in cold frames, afterwards transplanting the seedlings when large enough. Cuttings of the young flowerless shoots may also be inserted in sandy soil in spring or early summer under a glass.

ONOBRYCHIS (*Sainfoin*). — A genus with over 70 species of unarmed herbs or undershrubs, rarely very spiny shrubs. Leaves oddly pinnate, stipules scarious. Flowers in stalked spikes or racemes. Standard petal obovate or obcordate, narrow at the base, scarcely clawed; wings short, or very short; keel obliquely truncate at the apex, blunt, equal to or longer than the standard. Pod flattened half-round or roundish-circinate, unjointed.

O. sativa (*Common Sainfoin*). — A British and European species 2–3 ft. high, with elliptic-oblong, mucronate leaflets, and bright rosy-red flowers with darker veins in ovoid compact racemes in summer. The variety *montana* is a more desirable plant 6–12 in. high, from the Alps. It is a pretty decumbent rock plant, with cuneate lance-shaped, mucronulate leaflets, and purplish-rose flowers.

O. Laconica is a beautiful species differing from *O. sativa* in its larger bright pink flowers, more glaucous foliage, and a dwarfer and more compact habit.

Culture and Propagation.—Very few species are cultivated. They like deep sandy, loamy soils, and are easily increased from seeds sown in spring or autumn in the open border where the plants are to bloom. Open sunny situations suit them best.

LESPEDEZA.—A genus containing about 25–30 species of shrubs or undershrubs often covered with soft silky hairs. Leaves pinnately 3-foliolate. Stipules free, often minute. Flowers purplish, rose, or white, borne in axillary clusters or racemes, or in panicles at the ends of the branches. Calyx lobes or teeth nearly equal, or the 2 upper ones slightly united. Standard petal obovate or oblong, with a narrow claw; wings falcate-oblong, free or slightly adhering to the incurved, blunt or beaked keel. Upper stamen free, or rarely uniting with the others. Pod ovate or roundish, flatly compressed.

L. bicolor.—A handsome shrub 4–8 ft. high, native of China and Japan. It has dark brown minutely warty stems distinctly ribbed when young and covered with greyish downy hairs. The leaves are composed of 3 more or less oval-elliptic leaflets ½–1⅓ in. long, and much broader than those of *L. Sieboldi.* The large branching racemes of blossoms are much less dense than those of *L. Sieboldi*, and the individual flowers also are somewhat smaller and not so highly coloured with rose-purple.

Culture and Propagation. — This species flourishes in ordinary good and well-drained garden soil, and is hardy in ordinary winters in the neighbourhood of London. It should be grown in warm and sheltered spots in order to secure the best results. Seeds may be sown in cold frames when ripe, and cuttings of the more or less ripened shoots may also be inserted in sandy soil under a handlight during the summer and autumn months.

L. Sieboldi (*Desmodium penduliflorum*).—A handsome hardy shrub 5–6 ft. high, native of N. China and Japan, with drooping branches and Laburnum-like leaves composed of 3 oblong lance-shaped leaflets, the terminal one of which has a much longer stalk than the others, but they are all covered with white hairs on the under surface. The pretty rose or lilac-purple pea-like flowers are produced in great profusion during the summer months in long slender drooping racemes 6–8 in. long, and give the plant a characteristic appearance. There is also a white-flowered form which is very handsome.

Culture and Propagation.—Although usually described as a shrub, *L. Sieboldi* is in reality an herbaceous perennial, as its stems are cut down to the ground every winter. New ones appear every spring, and the number thus increases and adds to the effect when in bloom. This species may be easily increased by division of the roots in early autumn and also in spring; and also by seeds in the same way as for *L. bicolor*.

Other species of recent introduction are *L. Delavayi* from Yunnan. It grows 3–6 ft. high and has a bushy habit. The 3 blunt elliptic leaflets are green above and silvery beneath, and the deep purple or violet flowers are borne in large panicles at the ends of the branches. *L. macrocarpa* from N. China is a shrub with racemes of small purple flowers, and *L. trigonoclada* is a remarkable herbaceous perennial with triangular stems, smooth leathery leaves, and panicles of pale yellow or whitish flowers. It is a native of China.

VICIA. — A genus with over 100 species of annual or perennial herbs, with abruptly pinnate leaves, the stalks of which often end in a simple or branched tendril. Flowers axillary or racemose. Standard petal obovate or oblong, emarginate; wings obliquely oblong, adhering to the falcate oblong or broad keel at the middle. Upper stamen free, or more or less united with the other nine. Pod flattened.

Culture and Propagation. — When grown in large clusters in borders some of the Vicias are very effective when in bloom, but afterwards they present a somewhat straggling and disorderly appearance. The weak stems require branches to hold them up. They will grow in any garden soil in open situations and may be increased by seeds sown either in spring or autumn in the open border; or in the case of perennials, by dividing the rootstock also in early autumn or spring.

V. argentea.—A Pyrenean perennial about 1 ft. high, with 4-angled stems, silvery leaves without tendrils, and oblong-linear, mucronate leaflets. Flowers in June, pink, many on a stalk, with a black-spotted keel.

Culture &c. as above.

V. Cracca (*Cow Vetch; Tufted Vetch*).—A rather pretty British perennial 2–6 ft. long. Leaves 1–4 in. long, with many linear-oblong, acute or mucronate leaflets. Flowers from June to August, bright blue, in dense racemes.

Culture &c. as above.

V. gigantea.—An ornamental species 3–5 ft. high. Leaves with about 13 pairs of oblong, mucronate leaflets. Flowers in June and July.

Culture &c. as above.

V. onobrychioides.—A pretty South European annual 2 ft. high. Leaflets numerous, linear, obtuse, or mucronulate. Flowers in June, purple, many on a long stalk.

Culture &c. as above.

V. tenuifolia.—A climbing perennial 1–2 ft. high, native of Germany and Tauria. Leaflets linear, smoothish, mucronate. Flowers in June, violet, in clustered, long-stalked racemes.

Culture &c. as above.

LATHYRUS (SWEET and EVERLASTING PEA).—A genus containing about 100 well-marked species of dwarf or climbing annual or perennial herbs. Leaves pinnate, the stalk ending in a tendril. Stipules leafy, more or less arrow-shaped, rarely entire at the base. Flowers on axillary, elongated stalks, solitary or racemed. Standard petal broadly ovate or roundish, emarginate; wings falcate-obovate or oblong, slightly adhering at the middle of the shorter incurved obtuse keel, or nearly free; upper stamen free or more or less united with the others. Pod flattened or nearly round. For cutting purposes both Sweet and Everlasting Peas are extremely valuable. The blossoms last a long time in water, and by constantly cutting the sprays fresh flowers are developed.

Culture and Propagation.—Most of the Lathyrus are pretty garden plants. They thrive in rich loamy soil, but many of them are not particular so long as the ground is fairly good. Grown as masses over rough slender branches in the open border, against walls, over trellises or arbours, both the annual and perennial kinds look very effective. The perennial sorts may be divided at the root in spring;

or they may, like the annuals, be sown in the open ground at that period. A few more cultural details will be found under the 'Sweet Pea' (*L. odoratus*).

L. californicus.—This is a native of N. California—closely related to if not actually a variety of the British Beach Pea (*L. maritimus*). It has 4–5 pairs of ovate-oblong, smooth, glaucous, sharply pointed leaflets, and semi-sagittate stipules. Flowers from July to September, many on a stalk, large, purple, with deeper veins.

Culture &c. as above.

L. Davidi.—This perennial species is a native of N. China and Japan, and has pinnate leaves ending in a tendril. There are 3–4 elliptic-acute leaflets 1½–2 in. long, and the yellowish-white flowers appear in summer on long-stalked racemes.

Culture &c. as above.

L. grandiflorus. — A beautiful large-flowered species native of S. Europe, with 4-angled winged stems. Leaves with one pair of ovate, blunt, waved leaflets, and small semi-sagittate stipules. Flowers from June to August, rosy-red.

Culture &c. as above. This species should not be planted too close to other plants, as its roots travel to a great distance and send up shoots from all parts, thus sometimes becoming a nuisance.

L. heterophyllus.—An 'Everlasting' Pea with erect rigid winged stems, native of Europe, one or two pairs of lance-shaped mucronulate leaflets, and winged leaf stalks. Flowers from July to September, 6–8 on a stalk, large flesh-coloured, with a whitish keel.

Culture &c. as above.

L. lætiflorus.—A Californian perennial 6–8 ft. high, with light green leaves cut into about a dozen small leaflets. The flowers appear in summer and are white or faintly flesh-coloured, the standard being veined and washed with bright pink behind.

Culture &c. as above. This requires a little protection in Scotland during winter. A warm sheltered spot suits it best.

L. latifolius (*L. sylvestris platyphyllus*). *Everlasting Pea.* — This beautiful and well-known climber is to be found in almost every garden, great and small. It is a native of Europe, and has winged stems, and leaves with one pair of elliptic mucronate leaflets. Stipules broad ovate. Flowers in summer, large, rosy, many on a stalk. The white variety *albus* is very beautiful.

Culture &c. as above.

L. magellanicus (*L. armitageanus*).—*Lord Anson's Pea.*—A strong-growing 'Everlasting' Pea, native of the Straits of Magellan. Leaves with one pair of ovate-oblong leaflets heart-shaped-sagittate stipules, broader than the leaves. Flowers from June to September, bluish-purple, many on a long stalk.

Culture &c. as above.

L. odoratus (*Sweet Pea*).—The wild Sweet Pea is a native of South Europe, with ovate sharply pointed leaflets, semi-sagittate, lanceolate leaflets, and winged stems. Flowers in summer, variously coloured, several on a stem.

Of late years the Sweet Pea has leaped into popular favour to such an extent that it has almost excluded most of the other kinds from the garden. There are about 150 varieties now sold, and they are nearly all charming in colour and free in flowering.

Culture and Propagation.—To obtain the best results from Sweet Peas they should be grown in well-manured and deeply dug loamy soil. The seeds may be sown out of doors in April in patches or rows according to the purpose for which they are required. They should be protected from the birds by wire netting or branches. When well above the ground slender twigs or stakes may be put to them for climbing. They will reach a height of 4–7 feet or more during the summer, and flower profusely. To prolong the period of flowers and a greater supply of them, the faded blooms should be picked off so as to prevent the development of seed-pods except on special varieties from which it is desired to save seeds. During hot dry summers a mulching of rotted manure and plenty of water will be beneficial.

Where cold frames or greenhouses exist, it is much better to sow the seeds about 5 or 6 in a 5 in. pot in February, having previously steeped them in cold or warm water for a few hours. When an inch or two high, plenty of light and air should be given—always excluding frost. By the end of April or May according to locality and mildness or otherwise of the season, they will be sturdy for planting out, after which they may be staked and treated as above. In mild seasons, however, they may be planted out about the second or third week in March with safety if they have not been grown in too high a temperature previously.

The variety of uses to which Sweet Peas may be put are many, and one of their great charms is to make an otherwise dingy-looking garden bright and gay, and give an abundance of blossom, which if picked when just opening and on long stalks will last a week or more in vases of fresh water.

A few of the best varieties grown are mentioned below, and an attempt has been made to group them according to the prevailing colour.

White Sweet Peas.—Blanche Burpee, Cupid, Emily Henderson, Mrs. Sankey, Queen of England, Saidie Burpee, Sensation.

White, Blush, shaded or striped Pink, Rose, Purple, Lavender &c.—Aurora, Capt. Clark, Daybreak, Delight, Dolly Varden, Duchess of Sutherland, Earliest of All, Eliza Eckford, Empress of India, Gaiety, Isa Eckford, Juanita, Lemon Queen, Princess of Wales, Ramona, Senator.

Pink, Cerise, in various shades.—Adonis, Alice Eckford, Apple Blossom, California, Countess of Aberdeen, Countess of Shrewsbury, Cupid, Duke of York, Emily Lynch, Hon. F. Bouverie, Katherine Tracey, Lady Mary Currie, Lord Penzance, Lottie Hutchins, Lovely, Modesty, Mrs. Gladstone, Ovid, Peach Blossom, Pink Friar, Prima Donna, Princess Beatrice, Red Riding Hood, Royal Robe, Royal Rose, Violet Queen.

Purple in various shades. — Black Knight, Captain of the Blues, Carmen Sylva, Countess of Cadogan, Dorothy Tennant, Duke of Clarence, Duke of Sutherland, Duke of Westminster, Emily Eckford, Fashion, Grand Blue, Imperial Blue, Indigo King, Madame Carnot, Maid of Honour, Monarch, Navy Blue, Othello, Purple Prince, Shahzada.

Lavender, Heliotrope, Lilac, various shades.—Burpee's Bush Sweet Pea (18-24 in. high), Colonist, Countess of Radnor, Creole, Duchess of York, Golden Gate, Grey Friar, Lady Grisel Hamilton, Lady Nina Balfour, Lottie Eckford, New Countess, Princess May, Wawona.

Yellow, Primrose, Orange, Salmon, various shades.—Chancellor, Coquette, Countess of Powis, Golden Gleam, Gorgeous, Lady Beaconsfield, Meteor, Mrs. Eckford, Oriental, Primrose, Queen Victoria, Stella Morse, Triumph.

Rose, Crimson, Scarlet, Red.—American Belle, Blanche Ferry, Brilliant, Bronze King, Cardinal, Duchess of Edinburgh, Firefly, Her Majesty, Ignea, Invincible Carmine, Little Dorrit, Mars, Mikado, Miss Hunt, Mrs. Dugdale, Novelty, Oddity, Painted Lady, Prince of Wales, Prince Edward of York, Queen of the Isles, Rising Sun, Salopia, Scarlet Invincible, Splendour, Stanley, The Belle, The Queen, Vesuvius.

L. pubescens.—A charming Chilian perennial about 6 ft. high, with a somewhat shrubby habit, and oddly pinnate leaves more or less covered with down all over. The large and beautiful pale lilac-purple flowers appear in June in dense racemes, and seeds are produced in due course if the blooms are allowed to remain unpicked.

Culture &c. as above. In the colder and more northern parts of the country it is advisable in severe winters to give a little protection to the dormant roots with some dry leaves, bracken &c.

L. roseus.—A native of Spain, with ovate, roundish leaflets, very short tendrils, and small awl-shaped stipules. Flowers in summer, rosy, on thread-like stalks.

Culture &c. as above.

L. rotundifolius (*L. Drummondi*).—A pretty Everlasting Pea, native of Persia, Asia Minor &c., with ovate, roundish leaflets, semi-sagittate stipules, and winged branching stems. Flowers from May to July, bright rose-pink, an inch across, and in large clusters.

Culture &c. as above.

L. Sibthorpi. — A beautiful early-flowering Everlasting Pea, 2-3 ft. high. The flowers appear in May and June in rich masses and are of a beautiful rosy-purple colour, very useful for cutting.

Culture &c. as above.

L. splendens (*Pride of California*).—A beautiful Everlasting Pea, native of southern California. It has 4-angled stems about 12 ft. long, and slender pinnate grey-green leaves. From 6 to 12 very distinct carmine-red blossoms are borne on the racemes during the summer months in the open air, but somewhat earlier in a greenhouse.

Culture &c. as above. This species

requires very hot and dry situations, but likes plenty of water during growth. It is rather too tender for any except the mildest parts of the kingdom out of doors, but makes a charming and brilliant climber for cold greenhouses.

L. tingitanus (*Tangier Pea*).—A pretty Tangierian annual, with winged stems, ovate, blunt, sharply pointed leaflets, and ovate, semi-sagittate stipules. Flowers in summer, with a large purple standard, and bright red wings and keel.

Culture &c. as above.

L. tuberosus.—This native of Europe, Asia, and N. Africa is now naturalised in some parts of England, and is also grown in Holland for its edible, tuberous roots. The stems are 4-angled, and the leaves have one pair of oblong, elliptic leaflets, and narrow, acute, semi-sagittate stipules. Flowers in summer, large, rosy, 3-6 on a stalk, very free.

Culture &c. as above. As the roots of this species travel a good deal under ground, plants should be placed where they will not interfere with choicer subjects.

L. violaceus.—A rather pretty Californian perennial 6-8 ft. high, with pale green leaves composed of 10-12 leaflets, and racemes of violet-blue flowers produced in summer.

Culture &c. as above. Requires protection in northern parts in winter.

OROBUS (Bitter Vetch).—Bentham and Hooker consider this to be merely a botanical section of *Lathyrus*. For garden purposes, however, it is quite distinct, and is best kept separate from the Sweet and Everlasting Peas. It differs from *Lathyrus* chiefly in having no tendril at the tip of the leaf-stalk, and in the plants as a rule being dwarf, tufted, and non-climbing in habit.

Culture and Propagation.—They thrive in any good garden soil, and are easily increased by dividing the rootstocks in spring, or by sowing seeds at the same period. They are suitable for rougher parts of the rockery, margins of shrubberies, borders &c.

O. atropurpureus.—An elegant Algerian perennial 1-1½ ft. high, with leaves composed of 2-3 pairs of sharp linear leaflets and small semi-sagittate stipules. The deep rose or violet-purple flowers appear in May and June in loose racemes.

Culture &c. as above. In cold northern parts this species requires protection in winter with dry leaves &c.

O. aurantius.—A Caucasian perennial 1½-2 ft. high, with 5-6 pairs of lance-shaped, bluntish leaflets, and deep yellow flowers in early summer.

Culture &c. as above.

O. cyaneus (*Platystylis cyaneus*).—A pretty Caucasian species 6-12 in. high. Leaves with 2-3 pairs of closely set, narrow, lance-shaped, acute leaflets. Flowers in spring, blue at first, changing to purple, large, handsome, few on a stalk.

Culture &c. as above.

O. filiformis (*O. canescens*).—A native of S. Europe, with 4-angled stems, and leaves with 2-3 pairs of linear, bluntish, downy or dotted leaflets. Flowers in May, white, tinged with blue, many on a stalk.

Culture &c. as above.

O. flaccidus.—A native of Croatia, 6 ft. high. Leaves with 2-3 pairs of long, smooth, opposite, linear leaflets, dark green above, pale beneath; stipules large, semi-sagittate. Flowers in May, purple, with 2 prominent blunt teeth near the middle of the standard petal.

This is closely related to *O. vernus*, and is regarded as a botanical form of it.

Culture &c. as above.

O. hirsutus.—A native of Thrace, 1 ft. high. Leaflets ovate, acute, parallel-nerved. Flowers in May, red.

Culture &c. as above.

O. lathyroides (*Vicia oroboides*).—A pretty Siberian species, 1-1½ ft. high. Leaves composed of 2 leaflets 2 in. long, 1 in. broad, oval, lance-shaped acute; stipules semi-sagittate, toothed at the base. Flowers in early summer, blue, small, numerous.

Culture &c. as above.

O. luteus.—A handsome Siberian species 1-2 ft. high. Leaves with 3-5 pairs of elliptic lance-shaped, pointed leaflets, glaucous beneath. Flowers in June, yellow, many on a stalk.

Culture &c. as above.

O. niger.—A pretty European species 1½-3 ft. high, with flexuous stems, and glaucous green leaves composed of about 3 pairs of small oval-oblong leaflets. In June and July about 8-12 handsome violet-red flowers are borne on the racemes which are freely produced.

Culture &c. as above. This graceful species is remarkable for the blackish tint of the foliage when drying off.

O. pannonicus. — A native of South Europe, 1 ft. high. Leaves with 2–8 pairs of linear, mucronate leaflets. Flowers in May, varying from white and cream tinged with rose to purple and white and yellow, many on a stalk. The variety *varius* has rose standards, and yellowish wings and keel, and angular stems.

Culture &c. as above.

O. variegatus.—A native of S. Europe, with flexuous stems 1 ft. high. Leaves with 2–8 pairs of ovate lance-shaped pointed leaflets. Flowers in early summer, beautifully variegated, the standard fine rose, veined and netted with purple-crimson, the wings being tipped with blue.

Culture &c. as above.

O. vernus.—A beautiful Central and S. European perennial, 1–1½ ft. high. Leaves with 2–8 pairs of shining, ovate pointed leaflets, and semi-sagittate stipules. Flowers in spring, purple and blue, with red veins, the keel tinged with green, freely produced on one-sided nodding stalks. There is a white-flowered variety (*albus*) and also a double-flowered form of the coloured type.

Culture &c. as above.

ERYTHRINA (CORAL TREE). — A genus with about 25 species of trees or shrubs, often thick and prickly. Leaves pinnately 3-foliolate; stipules small. Flowers usually bright scarlet, in terminal racemes. Standard petal larger and longer than wings or keel. Calyx spathe-like, truncate, 5-toothed. Stamens 10, upper one usually free. Pod stalked, linear, falcate, flattened or round.

E. Crista-galli.—This is a beautiful Brazilian shrub 6–8 ft. high, with ovate, rather glaucous leaves, leathery leaflets, and prickly, glandular stalks. Flowers in early summer, deep brilliant scarlet, in large trusses at the ends of the branches, often 12–20 in a raceme. There are several varieties, all useful for decorating the garden during the summer months if too tender to stand the winter.

Culture and Propagation. — This species will grow against a warm south wall for many years if the rootstock is protected from frost by ashes, litter &c., and every spring it will send up its thick shoots. It should be grown in rich loamy soil, and during active growth should have plenty of water. In winter, however, it must be kept dry.

Another and very general method of cultivation is to treat the Coral Tree exactly in the same way as Dahlias. The thick rootstocks are lifted as soon as frost appears and are wintered in dry sheds or cellars free from frost, after the old stems have been cut down to within a few inches of the base. About February or March they are placed in a warm greenhouse or hotbed, slightly covered with soil and gently watered from time to time. This treatment induces the development of strong young stems, and as many as 40 or 50 will be produced on a good strong and healthy old rootstock. The plants may be potted up and grown on under glass till the end of May or June, until the weather is favourable enough for outdoor planting. Grown in large bold groups on the grass, as is done in the London parks, is a very effective method of displaying the striking and brilliant beauty of the Coral Tree.

The plants may be increased by cuttings in spring in the same way as Dahlias. When the young shoots have grown 3–6 in. long in the warm greenhouse they may be detached at the very base with a sharp knife, and inserted singly in light sandy soil in small pots. If kept close and shaded and fairly moist for a short time the cuttings soon root, and may afterwards be potted on and hardened off for outdoor planting like the older plants. It may be added that frequent waterings with liquid manure during the growing season will be of great advantage to the plants, and a good mulching of well-rotted cow manure on top of the beds will also be highly beneficial. The other species of Erythrina require indoor treatment, although *E. herbacea*, with bright scarlet flowers, may be treated almost in the same way as *E. Crista-galli*.

APIOS (GROUND NUT). — A genus with 3 species of climbing perennials, having pinnate 3–7-foliolate leaves, and small stipules. Flowers axillary in panicles or clusters at the ends of the branches. Standard petal reflexed, ovate or roundish, longer than the obliquely ovate wings; keel elongated, much incurved, involute, or spirally twisted. Stamens 10, upper one free. Pod linear, more or less sickle-shaped, flattish.

A. tuberosa (*Glycine Apios*). — An elegant light and graceful twining perennial, native of Pennsylvania, with eatable floury tubers, and pinnate leaves composed of 5 oblong lance-shaped leaflets. Flowers from July to September, deep orange, dull brownish-purple or pink, sweet-scented, in dense axillary racemes.

Culture and Propagation. — When grown in a sunny sheltered position in rich sandy loam, this plant is effective, but is not suitable for cold damp positions. It may be increased by dividing the tuberous roots in spring and also by seeds sown in cold frames as soon as ripe. It is on the whole better to raise plants from seeds, as the fleshy roots do not always separate well, and often die after division. The roots are eaten chiefly in winter time by the N. American Indians, and the idea was once entertained of growing them in Europe as a substitute for the Potato when the tubers of the latter were so much subject to disease.

CLADRASTIS.—A genus with two species of small trees, having oddly pinnate leaves, no stipules, and flowers in terminal panicles. Standard petal obovate-orbiculate, reflexed above the middle; wings obliquely oblong; keel slightly incurved, blunt. Stamens 10, free, or very shortly connate at the base. Pod linear, compressed, slender.

Culture and Propagation. — These plants grow best in sandy loam, and are suitable for shrubberies or perhaps in clumps on lawns. They may be increased by seeds which are freely produced in hot and favourable seasons; or by cuttings of the roots.

C. amurensis (*Maackia amurensis*).— An ornamental shrub about 6 ft. high, native of the Amoor Valley. Leaves with 3-4 pairs of ovate-oblong leaflets. Flowers late in summer, greenish-white, small, in long, dense, erect racemes.

Culture &c. as above.

C. tinctoria (*C. lutea; Virgilia lutea*). *Yellow Wood.* — A small N. American tree, with smooth pinnate leaves having 7-11 ovate leaflets. Flowers in May, white, in large drooping racemes from the ends of the branches. There is a form with variegated leaves which is said to be constant.

Culture &c. as above.

AMMODENDRON.—A small genus (3 species) of silvery silky shrubs, with abruptly pinnate leaves, having spiny stalks, and inconspicuous stipules. Flowers in terminal racemes. Standard petal roundish, recurved; wings obliquely oblong; keel incurved, blunt. Stamens 10, free. Pod linear or lance-shaped, flattened.

A. Sieversi (*Sophora bifolia*). — An elegant evergreen shrub 2-4 ft. high, native of Siberia. Leaves with 2 lance-shaped leaflets, silky, white on both sides. Flowers in June, purple, racemose.

Culture and Propagation. — This species thrives in well-drained sandy loam, and may be increased by seeds sown in spring out of doors, or in autumn as soon as ripe in warm sheltered spots. It may also be increased by layers during summer and autumn.

SOPHORA.—A genus with over 20 species of trees, shrubs, rarely herbs, having oddly pinnate leaves, and flowers in simple terminal racemes or panicles. Standard petal broadly obovate or roundish, often shorter than the oblong keel; wings obliquely oblong. Stamens 10, free, or rarely united in a ring at the base. Pod necklace-shaped, round, or slightly compressed, fleshy, leathery, or woody.

Culture and Propagation. — The Sophoras thrive in good sandy loam, and may be increased by imported seeds or by layering the branches. Cuttings of the roots may also produce young plants if placed in bottom heat at the beginning of the year. The weeping varieties are grafted on stocks of the commoner forms.

S. japonica (*Styphnolobium japonicum*).—*Chinese* or *Japanese Pagoda Tree.* A beautiful deciduous tree, 30-40 ft. high, native of China and Japan, and resembling the False Acacia (Robinia) in habit. The graceful bluish-green leaves have 9-13 oblong-ovate, acute leaflets. Flowers late in summer, white or creamy, small, in large, loose panicles at the ends of the branches. There is a not particularly beautiful variegated form, and also a drooping one (*pendula*), which are best grafted on the ordinary variety. A newer variety called *hybrida* only differs from the weeping form in the main branches spreading out horizontally, and in the branchlets being long, thin, and drooping.

Culture &c. as above. The Pagoda Tree and its weeping variety make excellent lawn and park trees when sufficient space can be given them, the light airy effect of their foliage and the refreshing shade they give being highly appreciated.

S. platycarpa. — A Japanese species with the habit and general appearance of *S. japonica*, from which, however, it differs a good deal in the fruits.

Culture &c. as above.

S. tetraptera (*Edwardsia tetraptera*). A beautiful deciduous tree 6–12 ft. high, native of New Zealand, with leaves composed of 6–40 pairs of leaflets ¼–¾ in. long, varying from broadly obcordate to linear oblong. Flowers in May, yellow, 1–2 in. long, in crowded racemes at the ends of the branches. The variety *microphylla* is distinguished by its smaller leaflets.

Except in the very mildest parts of the country, perhaps, this species requires protection from frost. It is extremely elegant on account of its finely divided foliage, and its great masses of drooping yellow blossoms.

Culture &c. In most parts of the kingdom it requires the protection of a south wall, but may possibly succeed as a bush in the mildest parts of the south and west. It may be increased by seeds sown in gentle heat in spring; or by cuttings of the young shoots inserted in sandy soil in gentle heat; or by layering the branches in autumn.

SUB-ORDER II. CÆSALPINEÆ.

Flowers irregular, rarely regular. Sepals and petals 5, or the latter fewer by abortion, imbricate, upper one innermost. Stamens usually 10, usually free.

CÆSALPINIA.—A genus with about 40 species of pretty trees or shrubs, sometimes climbing, unarmed or with stiff sharp prickles. Calyx with 5 imbricated segments. Petals 5, usually roundish, imbricated. Stamens 10, free, bent down, filaments often hairy or glandular at the base. Pod ovate, oblong, lanceolate, or falcate, flattened.

C. japonica (*C. sepiaria*).—A Japanese prickly tree said to reach a height of 60 ft. in a wild state. Leaves twice pinnate, graceful, of a pleasing soft green tint, each pinna being composed of about 10 pairs of pinnules. Flowers in summer, deep yellow, with pinky anthers in the centre, and borne in racemes at the ends of the branches.

Culture and Propagation. — Cæsalpinias are usually grown under glass, but the species described above, if planted in light, sandy, peaty soil in sunny situations, has proved quite hardy in this country. It may be increased by imported seeds sown in cold frames on arrival or in gentle bottom heat; or by layering the branches in autumn. It is better to allow the prickly stems to remain unpruned except in cases where they become too dense and prevent the ripening influence of sunshine and air.

GYMNOCLADUS (KENTUCKY COFFEE TREE).—A genus with two species described below with the generic characters as stated under *G. canadensis*.

G. canadensis.—An ornamental deciduous unarmed tree 30–60 ft. high, native of N. America. Leaves twice pinnate, often 3 ft. long, with 4–7 pairs of pinnæ, each one having 6–8 pairs of ovate leaflets. Flowers from May to July, polygamous, white, in clusters at the ends of the branches. Calyx with 5 narrow, nearly equal segments. Petals 4–5, oblong. Stamens 10, free, shorter than the petals, with thickish, hairy filaments. Ovary minute or wanting in the male flowers; sessile, with a thickened oblique stigma in the female and hermaphrodite ones. Pod oblong, somewhat falcate, thick, swollen or nearly round.

Culture and Propagation.—This tree loves a deep rich loamy soil and somewhat shady positions. It may be increased by cuttings of the roots inserted in bottom heat in early spring, or from imported seeds.

G. chinensis (*Soap Tree*). — A hardy Chinese tree having large twice pinnate leaves, composed of numerous bluntly oblong leaflets. The whitish flowers are produced at the ends of the branches in early summer. In China the women use the soft substance inside the seed pods for washing the face, hence the popular name.

Culture &c. as above for *G. canadensis*.

GLEDITSCHIA.—A genus with 4 or 5 species of ornamental deciduous trees, often armed with simple or branched rigid spines. Leaves twice pinnate, and also on the same tree abruptly pinnate. Flowers polygamous, in axillary clustered racemes or fascicled cymes. Calyx tube with 3-5 narrow subequal segments. Petals 3–5, sessile, unequal. Stamens 6–10, free. Pod ovate or elongated, flattened, leathery or fleshy.

Culture and Propagation. — The Gleditschias thrive in any fairly good soil, and may be increased by imported seeds. The plants are scarcely hardy enough to stand the rigours of a severe winter in the more northern parts of the British Islands.

G. macracantha. — A low-growing Chinese tree of spreading habit, and remarkable for the large branched spines on the trunk. The pinnate leaves are about 6 in. long, with a stout petiole and rachis channelled on the upper surface. The leaflets are fleshy in texture, bluntly oblong, with crenate-serrate edges, and of a rich deep green on the upper surface, but paler beneath.

Culture &c. as above. There used to be a fine specimen of this species in the gardens at Fulham Palace.

G. monosperma (*G. inermis*).—*Water Locust.*—A native of the United States 30–40 ft. high, with few slender 3-fid spines, ovate oblong acute leaflets, and greenish flowers in summer.

Culture &c. as above.

G. sinensis (*G. horrida*).—A Chinese tree 30-50 ft. high, with strong spines, ovate-elliptic, blunt leaflets, and greenish flowers in summer.

Culture &c. as above.

G. triacanthos (*Honey Locust*). — A native of the United States 30–50 ft. high, with strong simple or 3-fid spines, linear oblong leaflets, and greenish flowers in summer. There are a few varieties of this, including one without spines, and one with a drooping habit.

Culture &c. as above.

CASSIA.—A genus containing from 200 to 400 species (according to various authors) of ornamental trees, shrubs, or herbs, with abruptly pinnate leaves, and flowers in axillary or terminal panicles. Calyx segments 5, imbricated. Petals 5, imbricate spreading, nearly equal. Stamens 3-10, unequal, some abortive. Pod round or flattened, woody, leathery, or papery.

Culture and Propagation. — The species described below are the only ones that may be grown outside in this country, and even *C. corymbosa* and *C. lævigata* require protection in winter, the first named certainly. The Cassias like a rich sandy loam and peat, and may be readily increased from imported seeds sown in heat, or by cuttings of the half-ripened shoots under glass during the summer months.

C. coquimbensis. — A pretty Chilian shrub with leaves 2–4 in. long composed of 4–6 pairs of elliptic oblong mucronate leaflets. The flowers are bright yellow, 1-1½ in. across, and are borne in corymbose racemes at the ends of the shoots in summer.

Culture &c. as above. This species is generally grown in a cool greenhouse, but would probably succeed in the open air in the mildest parts of the south and west, with a little protection in winter.

C. corymbosa.—A native of Buenos Ayres 6-10 ft. high, with smooth oblong lance-shaped, rather falcate leaflets, and a profusion of yellow flowers in summer.

Culture &c. as above.

C. lævigata (*C. herbertiana*). — A native of New Spain, about 8 ft. high, with smooth ovate lance-shaped pointed leaflets having an oblong acutish gland between each pair on the stalk. Flowers in summer, golden-yellow, numerous.

Culture &c. as above.

C. marilandica (*Wild Senna*). — A smooth herbaceous perennial, native of N. America, 2–3 ft. high, with lance-shaped oblong, blunt leaflets, and axillary racemes of yellow flowers late in summer.

Culture &c. as above. This plant should be grown in sheltered sunny spots, and may be increased by dividing the roots in spring, or from seeds sown as soon as ripe in cold frames.

CERATONIA (Bean Tree; Carob Tree; Locust Tree).—A genus with one species described below with the generic characters.

C. Siliqua.—A native of the Mediterranean region 30–50 ft. high, with abruptly pinnate evergreen leathery leaves and oval blunt leaflets. Stipules minute or none. Flowers late in summer, small, reddish, polygamous, or diœcious, in short racemes. Calyx bell-shaped, with 5 short segments. Petals none. Stamens 5. Pod flattened, thickish, leathery, about 4 in. long, rusty colour, yielding a pulp which is eaten sometimes in this country by children.

Culture and Propagation.—This tree grows well in the mildest parts in warm sheltered spots. It may be increased by seeds or by cuttings inserted in sand under a glass during the late summer or autumn months, and protected during the winter.

CERCIS.—A genus with 6 or 7 species of unarmed, ornamental, deciduous trees or shrubs, distinguished by their simple kidney-shaped or cordate leaves, with 8 or many nerves. Flowers usually produced in clusters along the branches of one, two, or more years' growth. Calyx more or less bell-shaped, very short, and broadly 5-toothed. Petals 5, somewhat Pea-like. Stamens 10, free, bent down. Pod oblong, or broadly linear, flattened.

Culture and Propagation. — These trees like a deep rich sandy well-drained soil, and are fine plants for shrubberies or even alone on grass. When well established they are covered with flowers and may be justly regarded as amongst the finest flowering trees or shrubs in cultivation. They are usually increased by seeds sown in spring in gentle heat, but it takes 3 or 4 years to obtain a flowering plant. They are sometimes multiplied by layers. As old plants do not bear being transplanted very well, it is better to secure the permanent positions for Cercises while they are still young, say about 2 or 3 years old.

C. canadensis. — A Canadian tree 12–20 ft. high, with heart-shaped, pointed leaves, bearded in the axils of the veins beneath. The deep red and bright rose flowers appear in May in clusters along the trunk and branches before the leaves are developed.

Culture &c. as above.

C. chinensis (*C. japonica*). — A Japanese and Chinese species closely resembling the preceding in habit and foliage, but has larger pink or deep purple-red flowers, and is probably not quite hardy except in the milder parts of the country. The roundish ovate leaves taper rather abruptly to a point, and are about 4 in. across, and there are about 6 or 8 flowers in each cluster.

Culture &c. as above.

C. Siliquastrum (*Judas Tree; Love Tree*).—A native of S. Europe 20–30 ft. high, with smooth, bluntly heart-shaped, emarginate leaves 3–4 in. across and of a blue-green hue, and clusters of bright purple, pale rose or whitish flowers in May. There is a form of the Judas tree with variegated leaves.

Culture &c. as above. In unfavourable parts of the country this tree is best against a wall.

The following species of Cercis are known to botanists, but are not yet cultivated in the British Islands.

C. Griffithi.—A trailing shrub native of Afghanistan where it grows at an elevation of over 10,000 ft. It has smooth kidney-shaped emarginate leaves.

C. racemosa.—A distinct and handsome Chinese tree about 20 ft. high, with roundish leaves 2–4 in. long and broad, downy beneath. From 10 to 30 flowers are borne on racemes about 4 in. long.

C. texensis.—A shrub or small tree, native of the Rio Grande valley, and thus probably somewhat too tender for outdoor cultivation in the British Islands. It has heart-shaped reniform leaves, and clusters of rosy-pink flowers.

XXXIX. ROSACEÆ—Rose Order

A large order containing 1,000 species or more of erect or prostrate herbs, shrubs or trees, rarely climbers. Leaves various, simple or compound, alternate or rarely opposite, stalk often dilated at the base. Stipules 2, free or adhering to the leaf stalk. Flowers usually regular and hermaphrodite. Calyx free or adnate to the ovary, usually 5-lobed, imbricated and persistent. Petals 5, rarely none, inserted under the margin of the disc, imbricate. Stamens usually numerous, inserted with petals. Carpels 1 or many, free or united, and more or less adnate to the calyx-tube. Fruit various, superior, or more

A A 2

or less inferior, naked or enclosed by the persistent calyx-tube. Besides the Rose, the Apple, Pear, Plum, Cherry, Raspberry, Strawberry, Peach, Nectarine, Apricot, Almond &c. belong to this important order. Owing to the great range of variation, the order has been divided into 10 tribes, which however are not all represented out of doors in this country.

Tribe I. PRUNEÆ.—Trees or shrubs with simple leaves, often serrate. Calyx usually deciduous. Carpels 1. Fruit a drupe. Flowers regular. Stamens usually in 8 whorls of 5 or 10.

PRUNUS. — A genus containing about 80 species of evergreen or deciduous trees or shrubs, with alternate, simple, often serrulate leaves. Flowers solitary, racemose, or in fascicled corymbs, white or rose. Petals 5. Stamens 15–20.

Besides the Plums proper, this genus now includes the Almonds, Peaches, and Nectarines (*Amygdalus*); the Apricot (*Armeniaca*); the Cherry (*Cerasus*), and the Cherry Laurels (*Lauro-cerasus*).

Just here these plants are regarded solely from the point of view of beautiful ornamental flowering trees. The Almonds, Cherries, Plums, and Peaches are not only beautiful flowering trees, but they bloom at a period when they are most wanted, that is, from January to June. Of late years this fact has been appreciated to such an extent that small plants have been grown in pots for conservatory decoration in winter. The protection afforded by the glass alone is sufficient to make them flower earlier than out of doors.

As outdoor plants they may be utilised in shrubberies, or as isolated specimens in grass or even on lawns. Indeed, there are so many beautiful hardy flowering trees and shrubs now (see list, p. 107) that it is astonishing they are not more extensively planted instead of the cheerless and flowerless shrubs so often seen.

Culture and Propagation.—Speaking generally all the Plums, Cherries, Almonds and Laurels described below will flourish in ordinary good and well-drained garden soil, and in open but somewhat sheltered situations. Where it is possible to give particular attention to their cultivation, the cultural practice as detailed under the Plum (p. 1069), the Cherry (p. 1075), the Peach and Nectarine (p. 1078) may with advantage be adopted. It is not, however, necessary to practise all the details given under each of these fruits, as the objects in view are entirely different. In one case the aim of the gardener is to secure the finest possible crop of fruit; in the other he seeks only to obtain a beautiful well-shaped tree or shrub which shall bear abundance of blossom, and give the garden, park, and landscape generally a charming aspect. To secure this, ordinary good cultivation mixed with common sense will as a rule be sufficient. Pruning may be practised to a moderate extent, but only when the branches are apt to become too dense so as to exclude light and air from the interior of the tree, and prevent the proper ripening of the wood.

As for propagation, this is effected by seeds, budding, grafting, layering, and cuttings, but it will be better for the amateur as a rule to obtain established plants from a nurseryman. There is, however, no reason why he should not sow his own seeds as soon as ripe in sheltered spots in ordinary good soil. Plants are easily obtained in this way, but it takes a long time before they reach the flowering stage. By budding or grafting some of the best flowering Plums or Cherries on stocks of any of the ordinary kinds raised from seeds, flowering specimens will be obtained in a shorter time, and any particularly rare variety can also be more quickly increased in numbers by this process. A watch, however, must be kept to prevent suckers of the undesired stock springing from the base and absorbing the nourishment required by the choicer graft.

Layering is another operation easily performed with most of the species. By pegging branches down as explained at p. 59, plants will in due course be obtained on their own roots, and with such any suckers from the base will of course be the same as the variety.

Cuttings of the ripened branches 9 in. to 1 ft. long will also root freely with many kinds if inserted 3 or 4 in. deep in light rich and sandy soil about September or October in warm and sheltered spots, or under handlights in the case of kinds that may prove to be a little tender in winter. The soil should be pressed firmly round the cuttings so as to prevent them being lifted out or loosened by the action of frost.

Although doubtless convenient from a botanical point of view to have the Plums, Almonds, Cherries, and Cherry Laurels sunk under the genus Prunus, from a popular and gardening point of view it is perhaps not quite so desirable. It may therefore be useful to give a list as set forth in the 'Kew Handbook' showing the natural groups to which the various species described below belong.

The Almonds and Peaches (Amygdalus)

Leaves conduplicate in bud (*i.e. folded with the 2 halves face to face*). *Flowers nearly sessile, expanding before the leaves. Calyx short or elongated. Drupe often large, velvety; flesh firm; stone wrinkled and full of small holes.*

P. Amygdalus
P. Boissieri
P. davidiana
P. incana
P. nana
P. orientalis
P. Persica
P. Simoni

The Apricots (Armeniaca)

Leaves convolute in bud (*i.e. rolled up from one edge to another*). *Flowers sessile or stalked, expanding before the leaves. Calyx short or bell-shaped. Drupe velvety; flesh pulpy; stone smooth with a furrow on each side.*

P. Armeniaca
P. Brigantiaca
P. dasycarpa
P. Mume
P. tomentosa
P. triloba

The Plums (Prunus)

Leaves convolute in bud. Flowers stalked, solitary or in pairs, expanding before or at the same time as the leaves. Calyx short, obconical or hemispherical. Drupe quite smooth, often with a glaucous 'bloom'; stone compressed, oblong or ovoid, smooth or wrinkled.

P. alleghaniensis
P. americana
P. angustifolia
P. cerasifera
P. communis
P. divaricata
P. insititia
P. spinosa

* The Cherries (Cerasus)

Leaves conduplicate in bud. Flowers either solitary or in clusters or umbels, expanding before or at the same time as the leaves. Calyx short, obconical or elongated, sometimes cylindrical. Drupe quite smooth, not glaucous; stone smooth or wrinkled.

P. acida
P. Avium
P. Cerasus
P. Chamæcerasus
P. humilis
P. Jacquemonti
P. japonica
P. Maximowiczi
P. pendula
P. pennsylvanica
P. prostrata
P. pseudo-cerasus
P. Puddum
P. pumila
P. serrulata

** The Bird Cherries (Padus)

P. Capollin
P. cornuta
P. demissa
P. Mahaleb
P. mollis
P. Padus
P. serotina
P. virginiana

The Cherry Laurels (Laurocerasus)

Leaves conduplicate in bud. Flowers in racemes from the axils of the leaves or the ends of the branches. Calyx short, obconical. Drupe quite smooth, very rarely glaucous, oblong or round; stone smooth or wrinkled.

P. ilicifolia
P. Laurocerasus
P. lusitanica

P. acida (*Cerasus acida*).—A beautiful dwarf Cherry, native of Europe, and interesting not only for its ornamental flowering properties but also as one of the parents of the fruiting varieties. The beautiful white flowers are borne from May to September, and are well displayed among the small deep green glossy leaves. There is a double-flowered variety (*flore pleno*) and also one called *semperflorens*, with a drooping habit.

Culture &c. as above.

P. alleghaniensis.—A Pennsylvanian shrub 4–6 ft. high or more, having pure white flowers ½ in. across, changing to pink, followed by nearly round, bluish-purple fruit, useful for preserving.

Culture &c. as above.

P. americana (*P. nigra*).—*American Wild Yellow* or *Red Plum.*—A handsome N. American tree 8–20 ft. high, with more or less ovate, pointed, coarsely toothed leaves. Flowers in April and May, pure snowy-white. Fruits yellow, red, or orange, less than 1 in. in diameter, pleasantly flavoured.

Culture &c. as above.

P. Amygdalus (*Amygdalus communis*). *Common Almond.*—A beautiful tree 10–30 ft. high, native of Barbary, with oblong lance-shaped serrulate leaves. Flowers early in March, white or rose, in great profusion before the leaves. Fruit compressed, egg-shaped, woolly. There are several varieties all beautiful, among them being *amara* (Bitter Almond), with large white flowers rosy at the base; seeds bitter: *dulcis* (Sweet Almond), flowers red, earlier than the type; leaves grey-green; seeds sweet: *flore pleno*, flowers double, flesh-colour, rosy in bud; leaves oval elliptic, pointed: *fragilis*, leaves shorter than in the type; flowers pale rose: *macrocarpa*, leaves broader than in the type, pointed; flowers blush-rose, about 2 in. across with broadly obcordate wavy petals, and large fruits: and *pendula*, drooping in habit.

Culture &c. as above, p. 356.

P. angustifolia (*Chickasaw Plum*).—A native of the United States, where it attains a height of 15–20 ft. It has leaves 3 in. long, and white or creamy-tinted flowers, each about ⅓ in. across. There are several varieties, including a variegated one; but they are not yet well-known in this country.

Culture &c. as above, p. 356.

P. Armeniaca (*Armeniaca vulgaris*).—*Common Apricot.*—A native of N. China, 15 ft. or more high, with ovate, heart-shaped, smooth, serrated leaves. Flowers in February and March before the leaves, pinkish-white, stalkless. There is a double-flowered variety.

Culture &c. as above, p. 356.

P. Avium (*Cerasus Avium*).—*Wild Cherry* or *Gean.*—A beautiful British tree 20–30 ft. high, with oval lance-shaped, pointed, serrated, somewhat drooping leaves, slightly downy beneath, with 2 glands at the base. Flowers in April and May, before the leaves, white. Fruit roundish ovoid, depressed, black, with succulent sugary flesh adhering to the stone. This is one of the parents of the fruiting Cherries. A hybrid named *græca* has been obtained by crossing it with *P. Mahaleb*.

Culture &c. as above. The variety *decumana* is a striking tree with leaves 6–8 in. long. *Juliana* (*St. Julian's Cherry*) and its sub-varieties have large beautiful blush-tinted flowers appearing with the leaves, and ovate heart-shaped, sweet-flavoured fruits; *multiplex* has pure white double flowers; *nana* is dwarf in habit; *laciniata* has cut leaves; and *pendula* has a drooping habit.

P. biferum.—A vigorous tree of garden origin remarkable for bearing flowers and fruit at the same time. Leaves broadly oval, narrowed at both ends. Flowers in April, large, white, on the old wood, in small umbellate clusters; the later ones appearing on the young wood in short racemes.

Culture &c. as above, p. 356.

P. Boissieri (*Amygdalus Boissieri*).—An ornamental Almond, native of Asia Minor, not yet well known. Leaves 1 in. long, elliptic, leathery. Flowers in early spring, pale flesh-colour, numerous.

Culture &c. as above, p. 356.

P. Brigantiaca (*Armeniaca Brigantiaca*).—A South European Apricot 6–8 ft. high, with rather heart-shaped, pointed, sharply and numerously toothed leaves. Flowers in March, before the leaves, white or pink, almost sessile, in heads, followed by small yellow Apricot-like fruits.

Culture &c. as above, p. 356.

P. Capollin.—A Mexican Cherry 30–35 ft. high in a wild state. Leaves dark glossy green, loose, drooping. Flowers white, in erect racemes. Fruit round, dark red.

Culture &c. as above, p. 356.

P. caroliniana.—A pretty North American Cherry, with evergreen oblong lance-shaped mucronate smooth, rather leathery, almost entire leaves. Flowers in May, rather large, white, in dense axillary racemes.

Culture &c. as above, p. 356.

P. cerasifera (*Myrobalan*).—The native country of this showy Plum is unknown but it is supposed to be indigenous to the Caucasus. It forms a very handsome round-headed tree about 20 ft. high, with elliptic obovate acute, serrulate leaves, smooth beneath. Flowers in March and April before the leaves, white, about 1 in. across, in clusters on short twigs. Fruit red, round, yellow-fleshed. *P. Pissardi* (or *P. cerasifera atropurpurea*) is a beautiful variety of Persian origin. It has glossy, blackish-purple twigs, and smooth, broadly oval, reddish-purple leaves; flowers white; fruit small, deep red or purple, sugary when ripe. The foliage is now extensively used by florists for floral decorations.

The variety *contorta* has spirally

twisted leaves, and the tree is more fastigiate in habit than the type.

Culture &c. as above. The typical species is also known as *P. mirobalana* and *Cerasus myrobalanos*, and for this reason has been a good deal confused with another Plum called the 'Mirabelle,' which is a variety of the common wild Plum, *P. communis*.

P. Cerasus (*Cerasus vulgaris; C. Caproniana*).—*Wild* or *Dwarf Cherry.*—A small British tree, 15-20 ft. high, with red bark, slender drooping branches, and dark blue-green, oblong obovate, or elliptic crenate-serrate, smooth leaves. Flowers in May, pure white. The variety *Bigarella* (*Cerasus duracina*) is supposed to be a parent of the Bigarreau and Heart Cherries.

Many fine varieties are known, the best perhaps being:—*Flore pleno*, a distinct and beautiful double-flowered variety; *multiplex* (or *ranunculiflora*), also a fine double-flowered form; and *Rhexii fl. pl.*, another variety with pure white long-stalked double flowers in great profusion. *Semperflorens*—the All Saints, Ever-Flowering, or Weeping Cherry—is a beautiful variety with gracefully drooping branches; and *persiciflora* has double white flowers tinged with rose.

Culture &c. as above, p. 856.

P. Chamæcerasus (*Cerasus chamæcerasus*).—*Ground Cherry.*—A dwarf European Cherry 10 ft. or more high, with obovate, shining, crenate, bluntish, smooth, rather leathery leaves. Flowers in May, white, about ¾ in. across, usually in sessile clusters. Fruit round, reddish-purple, acid. The variety *pendula* has a drooping habit, and there is also a form with variegated leaves.

Culture &c. as above, p. 856.

P. Cocumilio.—An ornamental Plum from S. Italy, with obovate serrate leaves and masses of white-flowers in spring, succeeded by beautiful yellow fruits.

Culture &c. as above. Although a native of a warmer climate than our own, this species seems to be quite hardy. It grows about 20 ft. high, and one of the finest specimens in the country is to be found in the Oxford Botanic Gardens, where it flowers and fruits almost every year.

P. communis (*Common Plum*). — An ornamental tree 10-15 ft. high, with ovate or oblong lance-shaped leaves, downy beneath when young. Flowers in March and April, white. The variety *Pruneauliana* has beautiful masses of white flowers in April, and there is also a double-flowered form of it. The Sloe and Blackthorn (*P. spinosa*), the Bullace (*P. insititia*) and the Wild Plum (*P. domestica*) are all varieties of *P. communis*, and in conjunction with it have probably produced the well-known cultivated Plum (see p. 1069). The variety *juliana* is much used as a stock for budding, as is also the one known as the 'Mirabelle' Plum alluded to above under *P. cerasifera*.

The double-flowered Blackthorn (*P. spinosa fl. pl.*) is a pretty March-blooming shrub, and a variety of the common wild Plum called *Plantieri* is very ornamental owing to its wealth of semi-double pure white flowers, succeeded by black and good flavoured fruits.

Culture &c. as above, p. 856.

P. dasycarpa (*Armeniaca dasycarpa*). A pretty Chinese Apricot 10-15 ft. high, with dark glossy green, ovate pointed serrate leaves; the white flowers appear in great profusion in March and April before the leaves unfold.

Culture &c. as above, p. 856.

P. davidiana (*Persica davidiana*).—A very ornamental Chinese tree, with wavy serrated leaves narrowed towards the base, and pale rose or white flowers, often produced as early as January in mild winters, and in great profusion. The pure white form is called *alba*, and the pink form *rubra*.

Culture &c. as above, p. 856.

P. demissa (*Cerasus demissa*). — A species of Bird Cherry, native of the United States, and closely related to *P. virginiana*. It may, however, be distinguished from the latter species by its thicker and more downy leaves, which are rounded or somewhat heart-shaped at the base. The pure white flowers appear in April and May on racemes 3-6 in. long.

Culture &c. as above, p. 856.

P. divaricata.—A graceful Caucasian tree 10-25 ft. high, with lance-shaped and ovate leaves 2 in. long, often nearly cordate at the base, smooth beneath. Flowers in March and April when the tree is in leaf, white, ¾ in. across, and borne in such profusion as to almost hide the branches.

This species comes very near *P. cerasifera*, but the flowers open a little later than that species. It makes a splendid subject for the lawn and is one of the most effective spring-flowering trees in cultivation.

Closely related is *P. baldschuanica* from Bokhara with obovate elliptic coarsely serrate leaves and red flowers.

Culture &c. as above, p. 356.

P. humilis (*P. Bungei*).—A small tree or bush 4–10 ft. high, native of China. The ovate pointed leaves are 1½–2 in. long, with glandular and ciliate stipules. The beautiful rosy-pink flowers, about ½ in. across, are borne freely in April and May.

Culture &c. as above, p. 356.

P. ilicifolia (*Cerasus ilicifolia*). — A beautiful Californian Cherry Laurel, with shining, evergreen, sharply toothed leaves, more or less Holly-like. Flowers in spring, small, white, in erect or nodding racemes 1–3 in. long. Fruit usually red, sometimes dark purple or black, about half an inch in diameter.

Culture &c. as above. This very distinct species is best near the shelter of a wall in warm, dry situations. It may not be hardy in bleak parts of the country.

P. incana (*Amygdalus incana*). — A handsome Caucasian Almond 2–4 ft. high, with obovate, serrate leaves, woolly, white beneath. Flowers in March and April, deep rosy-red, solitary, followed by downy flattened fruits. This species is closely related to *P. nana*.

Culture &c. as above, p. 356.

P. Jacquemonti.—A pretty Cherry from N. India, where it grows at an altitude of 6,000–12,000 ft. The ovate pointed leaves are 1½–2 in. long, and somewhat downy when young. Flowers bright rosy-pink, about ½ in. across, borne in great profusion on the previous year's growths about April and May.

Culture &c. as above, p. 356.

P. japonica (*P. sinensis*).—A charming Chinese Plum with oblong pointed, serrulate leaves, and clusters of small white flowers in spring. Fruit small, round, deep red, of a peculiar but agreeable flavour. The variety *flore pleno* has beautiful double flowers 1¼ in. across, white, more or less tinted with rose. A hybrid called *reptans* has been raised between *P. japonica* and *P. pumila*. It has somewhat trailing branches and red flowers. A form called *stricta* has erect branches and white flowers.

Culture &c. as above. In about two years flowering plants may be obtained from layers, but cuttings of the ripened shoots will also root in sandy soil under a handlight.

P. Laurocerasus (*Cerasus Laurocerasus*).—*Common* or *Cherry Laurel.*—A beautiful and well-known evergreen shrub 6–10 ft. high, native of the Levant. Leaves oblong lanceolate, serrate, with 2–4 glands beneath. Flowers in April and May, small, white, in racemes. There are many good varieties, among them being:—*angustifolia*, with narrow leaves; *camelliæfolia*, Camellia-leaved; *caucasica*, a sturdy variety called the 'Spanish Laurel'; *colchica*, very free-flowering; *rotundifolia*, round-leaved, much grown and planted; *variegata*, with variegated foliage; and *shipkaensis*, said to be hardiest of all. *Parvifolia* is a distinct narrow-leaved variety sometimes known as *Hartoghia capensis* in gardens.

Culture and Propagation. — Cherry Laurels will grow in almost any soil, and are mostly used for rough shrubberies. In such places they are as a rule much ill-treated and hacked about with knife and saw. Grown in sheltered but open spaces the Cherry Laurel would have a much handsomer appearance.

It may be increased by layering the lower branches in autumn, or by inserting cuttings of the ripened shoots in nicely prepared sandy soil in sheltered spots about September.

P. lusitanica (*Cerasus lusitanica*).—*Portugal Laurel.*—A beautiful Portuguese tree 10–20 ft. high, with evergreen ovate-lance-shaped, serrated leaves. Flowers in June, white, in drooping axillary racemes. Fruit ovoid, red when ripe. The variety *myrtifolia* is a dwarf, compact, upright-growing form with smaller Myrtle-like leaves; *azorica* has larger leaves and flowers. There is also a rare variety with variegated foliage.

Culture &c. as above for the Cherry Laurel.

P. Mahaleb (*Cerasus Mahaleb*).—The Mahaleb or Perfumed Cherry attains a height of 20–30 ft. in its wild state in Central and S. Europe, and supplies a red, hard, sweet-scented wood. Leaves broad, roundish, cordate, toothed. Flowers in April and May, white, in somewhat corymbose, leafy racemes. The variety *pendula*, with leaves 2 in. long, has a loose but not altogether drooping habit of growth and produces immense masses of sweet-scented blossoms; *variegata* has clean, silvery, variegated leaves, very ornamental. There are other varieties such as *globosa*, *chrysocarpa*, and *monstrosa* in cultivation, but they are not well known.

Culture &c. as above.

P. Maximowiczi.—A newly introduced Cherry, native of Japan and Corea, where it attains a height of 25–30 ft. and has a rusty down covering the under surface of the elliptic obovate, coarsely toothed leaves as well as the young shoots. The white flowers, each about ½ in. across, are produced in May on racemes 3–4 in. long, remarkable for their coarsely toothed bracts.

Culture &c. as above, p. 356.

P. miqueliana (*Cerasus herincquiana*). — A Japanese species related to *P. pendula*, from which, however, it differs in having darker coloured shoots, which, when young, are covered with a soft down, as are also the broader, thinner, and the more deeply and irregularly cut leaves, at the base of which are 2 orange glands. The flowers are pale pink or nearly white, the petals being narrowly obovate.

Culture &c. as above. Although cultivated at Kew this species is not yet well known.

P. mollis (*P. pattoniana; Cerasus mollis*).—A Bird Cherry 20–30 ft. high, native of the Western United States, and easily recognised by its blunt elliptic leaves, the under surface of which is covered with down. The white flowers, each about ½ in. across, are borne in corymb-like racemes in May, and are in due course succeeded by reddish fruits.

Culture &c. as above, p. 356.

P. Mume.—A Japanese Apricot with obovate or broadly elliptic, long pointed, doubly serrate leaves, rounded at the base, and smooth or downy beneath. Flowers early in the year before the leaves, red or white, usually twin. There are several forms with single and double flowers; also one with a drooping habit.

Culture &c. as above.

P. nana (*Amygdalus nana; A. besseriana*). — A beautiful dwarf Almond 2–3 ft. high, native of Tartary, with smooth, oblong linear, serrated leaves, narrowed at the base. Flowers in February and March, rosy, one on a stalk, but in great profusion.

Culture &c. as above. This species is more easily increased by layering than any other means.

P. orientalis (*Amygdalus argentea*).—*Silver Almond.*—A distinct-looking small-growing Almond native of Western Asia, remarkable for the silvery down which covers its short ovate leaves. It does not flower very freely owing to the unfavourable weather in the early period of the year, and it can only be considered quite hardy in the mildest parts of the British Islands.

Culture &c. as above.

P. orthosepala.—A compact-growing twiggy shrub 4–5 ft. high, native of Texas, having white flowers with projecting orange-coloured stamens. The dark blue or nearly blackish fruits are covered with a glaucous 'bloom,' and have a thick juicy yellow flesh of good flavour and quality.

Culture &c. as above. This is a comparatively new species, and is still practically unknown in a cultivated state.

P. Padus (*Cerasus Padus*). — *Bird Cherry* or *Hagberry.*—A beautiful tree 10–30 ft. high, native of the British Islands, Europe, N. Africa, and Asia. Leaves 2–4 in. long, elliptic or obovate, sharply and double serrate, unequally cordate at the base. Flowers in May, ½–¾ in. across, white, in erect (then drooping) racemes 3–8 in. long.

There are many varieties, such as *argentea*, leaves silver blotched; *aucubæfolia*, Aucuba-like leaves; *bracteosa*, with long bracts; *flore pleno*, a splendid double-flowered form; *heterophylla*, leaves various; *parviflora*, smaller flowers than in type; *rubra*, reddish flowers; *stricta*, with flowers in erect racemes. There is also a Manchurian variety with fine racemes of flowers which open some time before the ordinary form. *P. cornuta* from the Himalayas is a form of the Bird Cherry with larger, broader, and stouter red-stalked leaves than the native species.

Culture &c. as above.

P. pendula (*Cerasus pendula*). — A beautiful drooping Japanese Cherry, with leaves similar in shape to those of the Common Cherry (*P. Cerasus*). Flowers in March and April, beautiful soft rose or white, in great profusion.

Culture and Propagation. — This species should be planted in warm sheltered spots. It is said to come true from seed, but is often grafted on stocks 5–6 ft. high, to display its drooping character to advantage.

P. pennsylvanica (*American Wild Red Cherry*).—A graceful N. American tree 20–30 ft. high, with light reddish-brown bark, and oblong lance-shaped, pointed leaves, finely and sharply serrated, shining green and smooth on both sides. Flowers in May, white, many in a cluster. Fruit small, light red, round, sour.

Culture &c. as above.

P. Persica (*Persica vulgaris*).—*The Peach.*—The wild Peach is supposed to be of Asiatic origin. It grows about 15 ft. high, has smooth, lance-shaped, serrated leaves, and light or dark red, stalkless flowers in April and May.

There are several varieties, that with double flowers, *flore pleno*, being one of the best; the purple-leaved variety known as *foliis rubris* is pretty and distinct, and *magnifica* is a newer form surpassing in beauty any of the others. The variety *lævis* is the origin of the Nectarine, and is distinguished from the Peach by its smooth-skinned and rather firmer fruit.

Culture &c. as above. The treatment of the cultivated Peach and Nectarine will be found at p. 1078.

P. prostrata. — A rare and lovely dwarf Cherry, native of the mountains of the Levant, with long slender branches arching outwards and downwards to the ground. The broadly ovate finely toothed leaves are 1½–2 in. long on cultivated plants, but are usually much smaller in wild specimens. The flowers, which are borne in great profusion on very short stalks, are about ¾ in. across, and of a bright rose colour.

Culture &c. as above, p. 856.

P. pseudo-cerasus (*P. paniculata*).—*Bastard Cherry.*—A pretty Chinese and Japanese Cherry 6–20 ft. high, with downy branches and flower stalks, and obovate pointed, serrated leaves. Flowers in April and May, white or rosy-white, each about 2 in. across, in racemes. Fruit pale red, small, with a pleasant acid flavour.

The double-flowered varieties are far more beautiful and valuable ornamental trees than the type. In *flore pleno* the flowers are white at first, but are afterwards suffused with pink. *Watereri* is another fine double variety.

Culture &c. as above.

P. Puddum.—A rare Cherry 10–20 ft. high, native of the Bhotan and Sikkim Himalayas, where it grows at an elevation of 5,000–8,000 ft. The smooth serrate leaves are 3–4 in. long, and the beautiful soft rosy flowers, each about ¾ in. across, are borne in great profusion about April and May on leafless twigs. The red Cherry-like fruits are produced fairly freely in warm and sheltered spots.

Culture &c. as above.

P. pumila (*Cerasus depressa; C. glauca*).—A pretty N. American Cherry 3–6 ft. high, having dark coloured twigs clothed with bright green oblong leaves about 2 in. long. The white flowers are produced in great abundance during April and May, but in some varieties they are purer and prettier than in others.

Culture &c. as above, p. 856. This species is easily increased by cuttings of the well-ripened shoots inserted in light sandy soil in September, at which period the lower branches also may be layered. Grown in masses or groups this species looks very effective.

P. serotina. — A rather pretty Bird Cherry 20–40 ft. high, native of Canada and Central America, where it sometimes reaches a height of about 100 ft. The dark green glossy leaves resemble those of the Portugal Laurel (*P. lusitanica*), and readily distinguish it from the other Cherries. The whitish flowers appear early in June, and are borne in great profusion on racemes 3–6 in. long. The variety *pendula* differs from the type in having a drooping habit of growth.

Culture &c. as above, p. 856.

P. serrulata (*Cerasus serrulata; C. Sieboldi*).—*Double Chinese Cherry.*—A beautiful Chinese tree 15 ft. high, with smooth, obovate-acute, sharply serrated leaves. Flowers in April, pale white or rose-tinted, double, in clusters. The single-flowered type does not appear to be in cultivation.

Culture &c. as above, p. 856.

P. Simoni.—An erect-growing, somewhat fastigiate Chinese Almond with leaves like those of the Common Almond (*P. Amygdalus*). Flowers in February and March, white, succeeded by deep purple fruits.

Culture &c. as above, p. 356.

P. subhirtella.—A pretty erect-growing Japanese Cherry closely related to *P. pendula*. It has rather dull green ovate-pointed leaves more or less hairy on both sides. The beautiful soft rosy flowers, about ½ in. across, are borne in March and April, and give a very handsome appearance to the tree.

Culture &c. as above, p. 356.

P. tomentosa.—A pretty Chinese and Japanese shrub 5–9 ft. high, with leaves and branches more or less covered with soft downy hairs, and having large white, flesh-tinted flowers produced early in March and April, succeeded later on by Cherry-like fruits about ½ an inch in diameter. This species is not yet well known but has been proved quite hardy at Kew. It is interesting from the fact that it seems to stand between the Cherries and Apricots, thus linking the two.

Culture &c. as above, p. 356.

P. triloba fl. pl. (*Amygdalopsis Lindleyi; Prunopsis Lindleyi*).—This is perhaps the very best of all the beautiful flowering Plums, Cherries, or Almonds. It is a native of China and grows 10–15 ft. high, and is easily recognised by its 3-lobed leaves which appear after the flowers. The latter are produced in such profusion at the end of March or early in April as to practically cover the tree; they are usually white although tinged with rose when opening, double, and about 1½–2 in. across. The single-flowered variety is not yet well known, although it has recently been introduced. It has smaller, rosy-white flowers.

Culture &c. as above.

P. virginiana (*Cerasus virginiana*).—*Choke Cherry*.—A native of the United States, where it is said to grow from 20 to 30 ft. high. Leaves smooth, oblong, pointed, doubly serrate. Flowers in May and June, white, in long, erect racemes. Fruit round, red.

Culture &c. as above.

P. Watsoni (*Sand Plum*).—A recently introduced compact-growing twiggy shrub 8–12 ft. high, native of the United States. Its beautiful white or blush blossoms appear about the middle of May, 3 or 4 in cluster, and in such profusion that the twigs are almost completely hidden from view. The flowers are about ½ in. across, and emit a delicate fragrance. They are succeeded by bright orange-red shining fruits in warm and sheltered localities in favourable seasons.

Culture &c. as above.

NUTTALLIA (Osoberry).—A genus with only one species described below, with the generic characters:—

N. cerasiformis. — A rather pretty Californian shrub, 6–12 feet high, with obovate, entire, deciduous leaves. Flowers in March and April, polygamous-diœcious, white, small, in drooping racemes, sometimes before the leaves appear. Calyx campanulate, 5-lobed. Petals 5, oblong, shortly clawed. Stamens 15, the 10 upper ones inserted on the calyx, the 5 lower deflexed inserted in the middle of the tube. Fruit Plum-like, purple, about 1 in. long and ¾ in. broad, rarely ripens in even the most favoured parts of the British Islands.

Culture and Propagation. — This species grows well in ordinary soil and may be increased by the suckers from the roots, or from imported seeds. Cuttings of the more or less ripened shoots may also be rooted in sandy soil under a handlight. By layering the lower branches in autumn fresh plants may also be secured.

Tribe II. Spireæ.—Shrubs or trees. Calyx lobes usually persistent. Stamens 10 or more. Carpels 1–8, not enclosed by the calyx tube.

SPIRÆA (Meadow Sweet). — A genus with about 50 species of beautiful herbs, shrubs, or undershrubs, mostly deciduous. Leaves alternate, simple, pinnate, or 2–3-ternate. Stipules free, or sheathing and adnate to the leaf stalk. Flowers axillary or terminal, variously clustered, hermaphrodite or polygamous-diœcious. Sepals and petals 4–5. Stamens 20–60, inserted in 1 or more series or bundles round the mouth of the calyx tube. Carpels usually 5, dehiscent.

Culture and Propagation.—Spiræas may roughly be divided into two groups—shrubby-stemmed and herbaceous, the stems and leaves of the latter dying down in winter, the former losing only their leaves. The herbaceous kinds as a rule like a moist, loamy soil, and thrive near water. They may be increased by dividing the rootstocks in autumn or spring or by sowing the seeds as soon as ripe in cold frames.

HERBACEOUS SPIRÆAS

S. Aruncus (*Goat's Beard*).—A bold and beautiful herbaceous plant, 3–5 ft. high, native of North Europe, Asia and America, with thrice pinnate leaves a foot long, and lance-shaped oblong or ovate lance-shaped serrated leaflets. Flowers in June and July, white, diœcious, in many slender spikes thrown well above the foliage. *Americana* is a variety in which the interrupted male flowers are scarcely larger than the female ones, and the plant in some parts of the world, *e.g.* the Japanese Alps, attains only 1 ft. in height. The variety *triternata* has thrice ternate leaves, often covered with an ashy down beneath.

Culture and Propagation.—This is a fine plant for massing in the herbaceous border or for planting in beds by itself on the grass. It flourishes in both open and sunny situations and also in shade, providing there is always plenty of air, and the plants are not suffocated with overhanging branches of trees or placed too close to other plants. It may be increased by division in September or early in spring, or seeds may be sown as soon as ripe in cold frames, or in the open border, afterwards pricking off the seedlings the following spring when large enough, and in mild weather. When the plants are coming into bloom it will be found useful to give them a good mulching of well-rotted manure and also frequent and liberal waterings with liquid manure.

S. astilboides.—A distinct and graceful Japanese species, resembling *S. Aruncus* but dwarfer and with smaller and looser leaves and leaflets. Flowers in summer in white spicate panicles. The variety *floribunda* is superior to the type and produces finer trusses of blossom.

Culture &c. as above for *S. Aruncus.* A fine plant for the edge of a pond or stream. Although perfectly hardy it is now grown extensively under glass during the earlier months of the year as a pot plant for table and room decoration, for which purpose its graceful habit and freedom of flowering make it very suitable.

S. cæspitosa.—A tufted species 6 in. high, native of the United States, with small silky entire leaves; lower ones in a rosette, spathulate, the upper ones linear, minute. Flowers in summer, in dense spiked racemes.

Culture &c. as above for *S. Aruncus.*

S. digitata.—A Siberian herbaceous perennial closely related to the N. American *S. lobata*, from which, however, it differs in having the terminal leaf-lobe more rounded, and the other segments more numerous and narrower, and more or less hairy beneath, especially along the nerves. The flowers are pink or almost white.

Culture &c. as above for *S. Aruncus.*

S. Filipendula (*Dropwort*).—A native of the British Islands, 2–3 ft. high, with smooth, interruptedly pinnate leaves, 4–10 in. long, and deeply cut, serrate leaflets. Flowers in June and July, white or rosy outside, ¾ in. across, in loose, panicled cymes. There is a good double-flowered variety called *flore pleno* which is very pretty. Its flowers have been likened to snowflakes, and are very useful for bouquets and other floral decorations.

Culture &c. as above for *S. Aruncus.* The double-flowered variety is best increased by division only.

S. kamtschatica.—A native of Kamtschatca 6–9 ft. high, with palmately lobed leaves about 6 in. wide and 4 in. long, having channelled and coarsely hairy stalks, furnished with 2 leafy stipules at the base and a number of irregular leaflets along the whole length. The white, sweetly scented flowers are borne in corymbose heads. This species is also known as *S. gigantea* in some places.

Culture &c. as above for *Spiræa Aruncus.* Near the banks of lakes, ponds, or streams this fine ornamental species attains its greatest height. It is perfectly hardy even in frozen water. The hardy flower border is scarcely a suitable place for it.

S. lobata (*Queen of the Prairie*).—This is a smooth herbaceous perennial 2–3 ft. high, native of North America. Leaves interruptedly pinnate; end leaflet very large, 7–9-parted, lobes incised and toothed, stipules kidney-shaped. Flowers in June, deep rosy-carmine in large terminal cymes. The variety *albicans* has pale rose-coloured flowers.

Culture &c. as above for *S. Aruncus.* This species prefers a somewhat shaded situation.

S. palmata.—A strikingly handsome herbaceous perennial 1–2 ft. high, native of Japan, with crimson stems, and palmately 5–7-lobed leaves; lobes oblong-pointed, sharply serrated. Flowers from June to August, brilliant crimson, in large corymbose panicles. The variety *alba* has white flowers and lighter green leaves; *elegans* is said to be a hybrid between *S. palmata* and *Astilbe japonica* on the one hand, or merely a variety of *S. Ulmaria* on the other. It has white flowers with red anthers, and pinnatisect leaves. The variety *purpurascens* has purple-tinted foliage.

Grown near the edge of ponds or streams, or in moist loamy soil, *S. palmata* makes a noble plant. It may be utilised for the decoration of the greenhouse and conservatory, as well-established plants of it grown in pots will force into early blossom almost as easily as *Spiræa astilboides* and *Astilbe japonica*.

Culture &c. as above for *S. Aruncus.*

S. pectinata.—A N. American herbaceous perennial 6–12 in. high, with tufted creeping stems. Leaves 2 or 3 times cleft with linear acute lobes. Flowers in summer, whitish, in woolly racemes.

Culture &c. as above for *S. Aruncus.*

S. Ulmaria (*Queen of the Meadows*). A pretty native perennial 2–4 ft. high, with furrowed stems, and interruptedly pinnate leaves, white and downy beneath; lower ones 1–2 ft. long, terminal leaflets 1–3 in. long, acutely lobed. Flowers from June to August, white, in much-branched clusters 2–6 in. across. There is a variety called *phyllantha* in which the sepals are transformed into whorled, lance-shaped, sharply serrated leaves; petals and stamens absent, or more or less deformed. There is also a form in which the leaves are beautifully variegated with green, white, and yellow (*aureo-variegata*), besides one (*flore pleno*) having double flowers.

Culture and Propagation.—This species thrives on the edges of streams or ponds or in moist situations in the border or rock garden. It may be increased by seeds or division in the same way as *S. Aruncus.*

S. vaccinifolia (*S. laxiflora; S. rhamnifolia*).—A somewhat weak-growing Himalayan perennial 1–2 ft. high, with smooth, ovate, crenate leaves on long stalks, glaucous beneath. Flowers in July and August, white, in large, loose, shaggy panicles.

Culture &c. as above for *S. Aruncus.* This species requires warm sheltered positions.

S. venusta.—The origin of the true species is unknown. It grows 4–5 ft. high, and has the lower leaves palmately pinnatifid, the upper ones palmatifid with oblong lance-shaped coarsely serrate segments, downy beneath on the ribs. It has rosy flowers in June, and although near *S. lobata* is considered to be a distinct species.

Culture &c. as above for *S. Aruncus.*

S. vestita.—A Himalayan perennial 1–2 ft. high, with somewhat hoary pinnatisect leaves; terminal leaflet 2–6 in. across, palmately 3–5-lobed and toothed. Flowers in June, white, ¼ in. across, in much-branched oblong cymes.

Culture &c. as above for *S. Aruncus.* This species requires warm sheltered positions.

SHRUBBY SPIRÆAS

The shrubby Spiræas are increased by cuttings of the young wood inserted in sandy soil, and kept close and shaded until roots begin to form. The lower branches may also be layered in autumn. A large number of shrubby Spiræas ripen seeds in the British Islands, and such may also be increased by their means. The seed should be sown when ripe in cold frames, and the seedlings pricked out the following spring into light rich soil in a warm, but not too sunny, situation.

The shrubby Spiræas are effective in masses on grass or in the shrubbery where they have plenty of room.

S. alpina.—A Siberian species 4–6 ft. high. Leaves oblong lance-shaped, sessile, serrulate, smooth. Flowers in June and July, white in terminal corymbs.

Culture &c. as above.

S. arguta (*S. multiflora alba*).—A lovely early-flowering shrub 3–4 ft. high. It is a garden hybrid, one of the parents being the beautiful Japanese *S. Thunbergi*, the other a hybrid called *multiflora*. The plant has a graceful habit, and during May its wiry arching shoots are wreathed with clusters of pure white blossoms, almost before the smooth narrow leaves 1–1½ in. long are fully developed.

Culture &c. as above. This beautiful plant should find a place in every good collection of flowering shrubs. It is perfectly hardy in most parts of the kingdom, and may be easily increased by means of layers or cuttings of the young or half-ripened shoots. Plants in pots may be gently forced into early blossom in greenhouses in spring.

S. bella.—A Himalayan species 2–3 ft. high, with smooth, rusty-coloured stems, and smooth, ovate, serrate leaves, glaucous beneath. Flowers in July and August, beautiful red, in spreading terminal corymbs. There is a white-flowered variety.

Culture &c. as above, p. 365.

S. betulifolia (*S. corymbosa*).—An almost smooth shrub 1–2 ft. high, native N.E. Asia and N. America. Leaves simple oval or ovate, toothed towards apex. Flowers in June, creamy-white, in large flat compound corymbs.

Culture &c. as above.

S. Blumei.—A native of Japan 3–6 ft. high, with obovate, blunt leaves, deeply toothed at the apex. Flowers white, in terminal cymes.

Culture &c. as above, p. 365.

S. bracteata (*S. media rotundifolia*). A beautiful Japanese shrub 5–6 ft. high, very free in growth, having roundish leaves with 3 more or less blunt teeth at the apex. It produces an abundance of pure white sweet-scented flowers during the early summer months, in rounded clusters at the ends of the shoots. The upper leaves are much smaller and assume the form of bracts beneath the flower heads.

Culture &c. as above. This very fine plant looks well in bold masses and flourishes in good and fairly moist garden soil. It may be forced gently in greenhouses.

S. bullata (*S. crispifolia*).—A dwarf Japanese shrub 1–1½ ft. high, with erect, wiry branches, densely covered with a rusty down. Leaves nearly sessile, ½ in. long, ovate oblong, crenate, leathery, smooth, dark green and wrinkled above. Flowers in summer, deep pink or ruby, in dense terminal corymbs.

Culture &c. as above. An excellent shrub for the rock garden. It is quite hardy in the north.

S. cana.—A native of Central Europe, 1–2 ft. high. Leaves ovate, ½–1½ in. long, acute, entire or slightly toothed, hoary-haired. Flowers in summer, white, in racemose corymbs.

Culture &c. as above, p. 365.

S. canescens.—An erect, hairy shrub, 4–6 ft. high, native of the Himalayas. Leaves oval or obovate, blunt, entire. Flowers in summer, pale pink or white, in crowded tomentose corymbs. In the 'Kew Handlist' as many as 24 different names are recorded for this species.

Culture &c. as above, p. 365.

S. cantoniensis (*S. reevesiana*).—A smooth evergreen Japanese shrub, 3–4 ft. high, with small, simple, lance-shaped leaves, 3-lobed and deeply toothed. Flowers in early summer, white, in showy terminal umbels. There is a beautiful double-flowered variety.

Culture &c. as above, p. 365.

S. chamædrifolia (*S. ceanothifolia*). A species 1–2 ft. high, distributed from S.E. Europe to Japan. Leaves ovate, deeply serrate at the apex, downy. Flowers in summer, white, in half-round corymbs. The variety *flexuosa* has elliptic lance-shaped, unequally serrated leaves, and white flowers generally smaller than in the type. The variety *ulmifolia* is a handsome shrub, 3–5 ft. high, with Elm-like leaves, and white flowers in half-round terminal corymbs.

Culture &c. as above, p. 365.

S. decumbens.—A dwarf, trailing shrub 6–9 in. high, fit for rocks and banks, native of the Tyrol. Leaves roundish oval, crenately toothed. Flowers in summer, white, in terminal corymbs.

Culture &c. as above, p. 365.

S. discolor (*S. ariæfolia*).—*Spray Bush.*—A beautiful flowering shrub 8–10 ft. high, native of N.W. America. Leaves rigid, wedge-shaped at the base, dark green above, silvery beneath. Flowers in summer, dull white, in graceful, nodding panicles. This species is seen to the best advantage as an isolated specimen on grass. The variety *dumosa* (also known as *S. Boursieri*) differs from *discolor* in being dwarfer in growth, and with less branched panicles.

Culture &c. as above, p. 365.

S. Douglasi.—A beautiful shrub 3 ft. high, native of N.W. America. Leaves simple, oblong lance-shaped, blunt, serrulate at the apex, downy, white beneath. Flowers in August, rosy, in a dense terminal cluster 6–9 in. long. This species is sometimes known as *S. Menziesi*.

Culture &c. as above, p. 365.

S. **expansa** (*S. kumaonensis*).—A vigorous-growing compact shrub 4–5 ft. high, native of the Himalayas, and having rather large lance-shaped leaves, sharply and coarsely toothed near the apex, dull yellowish-green above, and blue-green beneath. The rather small pale red or pink flowers appear in August and September, and are borne in large branching panicles.

Culture &c. as above, p. 365.

S. **fissa.**—A vigorous Mexican shrub about 8 ft. high, with angular downy branches, small leaves, wedge-shaped at the base, with the side lobes split into a pair of unequal sharp teeth. Flowers in May and June, whitish, in loose terminal panicles.

Culture &c. as above. This can be grown with safety only in the mildest parts of the country.

S. **gracilis.**—A hairy-branched species 2 ft. high, native of Nepaul. Leaves obtuse or roundish elliptic, smooth, glaucous beneath, serrated at the apex. Flowers in July and August, white, in loose, rounded corymbs.

Culture &c. as above, p. 365.

S. **hypericifolia** (*S. flagellata*).—An Asiatic shrub 4–6 ft. high. Leaves obovate-oblong, 3–4-nerved, entire or toothed, smooth or slightly downy. Flowers in summer, white, in corymbs or sessile umbels. The variety *acuta* (*S. acutifolia*) has spathulate, acute, entire or rarely 3–5-toothed, rather smooth leaves and flowers in sessile corymbs; *Besseriana* has mostly entire leaves and flowers in rather loose corymbs; *crenata* has obovate crenate leaves; *thalictroides* from Mongolia has smooth glaucous obovate entire leaves, those on the sterile shoots being crenate-obovate or somewhat deltoid.

Culture &c. as above, p. 365.

S. **japonica** (*S. callosa; S. Fortunei*). A very beautiful Chinese and Japanese shrub 3–4 ft. high, with purplish stems and lance-shaped acute, serrated leaves. Flowers in June and July, light and dark rosy-red, in flat terminal corymbs.

There are several fine forms of this, including *alba*, a compact pretty bush about 1 ft. high, with white flowers; *Bumalda*, also dwarf and compact, 2 ft. high, with deep rose-pink flowers; and its sub-variety *Anthony Waterer* still more brilliant in colour, and very near *rubra*, a handsome form with brilliant purple-red flowers; *splendens* (or *hydrangeæfolia*) has peach-coloured flowers; and *superba* has deep rosy-red ones; *ruberrima* is a hybrid between the variety *Bumalda* and *bullata*. It is dwarfer in habit than *Bumalda* and has also larger and deeper coloured flowers.

Culture &c. as above. The plant grown in pots and sold in large quantities in spring as *Spiræa japonica* belongs to the Saxifrage order, and its proper name is *Astilbe japonica* (see p. 414).

S. **lævigata** (*S. altaica*).—A Siberian shrub 2–3 ft. high, with smooth, glaucous, entire, oblong lance-shaped leaves. Flowers in June, white, tinged with rose, diœcious, male flowers in larger and looser panicles than the female ones.

Culture &c. as above.

S. **lindleyana.**—A beautiful Himalayan shrub 4–12 ft. high, with large unequally pinnate leaves composed of 11–21 ovate lance-shaped, coarsely toothed leaflets, glaucous beneath. Flowers in July and August, white, in large plume-like clusters.

Culture &c. as above. In warm chalky soils, and sheltered from north and east winds, this species displays itself to great advantage. But it is near water, and in spots where it has plenty of space, that the greatest development takes place. Seeds are freely produced in favourable seasons, and often sow themselves.

S. **media** (*S. confusa; S. oblongifolia*).—A beautiful shrub 2–4 ft. high, native of N. Asia. Leaves elliptic lance-shaped acute, more or less serrate, hairy beneath. Flowers in June and July, white, in corymbs.

Culture &c. as above, p. 365.

S. **Millefolium** (*Chamæbatiaria millefolium*).—A dwarf evergreen Californian shrub with much cut leaves like those of the Milfoil (Achillea), smooth above, with stellate woolly hairs beneath. Flowers in summer, whitish, in terminal racemes.

Culture &c. as above.

S. **nobleana.**—This species comes from California, and is closely related to but not quite so hardy as *Douglasi*. It grows 3–4 ft. high and has elliptic or oblong, blunt or acute, more or less toothed leaves, downy or nearly smooth beneath. Flowers in looser clusters, purple-red, and earlier than *Douglasi*, usually in July and August.

Culture &c. as above, p. 365.

S. prunifolia.—A beautiful Chinese and Japanese shrub 4–5 ft. high, with small, smooth, elliptic oval leaves, connate at the base, and irregularly toothed toward the apex. Flowers in March, pure white, in clusters along the whole length of the branches. The double-flowered variety, *flore pleno*, is a more ornamental plant than the type.

Culture &c. as above. The foliage of this species assumes beautiful scarlet tints in autumn, and is very ornamental.

S. pubescens (*S. chinensis*).—A Mongolian shrub, 2 ft. high, with ovate oblong, acute leaves 1½ in. long, much wrinkled, deeply serrated, somewhat 3-lobed, downy beneath. Flowers in March, pure white, small, slightly fragrant, in rounded heads.

Culture &c. as above, p. 365

S. salicifolia.—A native of Europe, N. Asia and N. America, but now naturalised in parts of the British Islands. It grows 3–5 ft. high, with leaves 2–3 in. long, oblong lance-shaped, serrate. Flowers in July and August, rosy-pink, in dense, somewhat cylindrical cymes. There are several forms, the peculiarities of which are indicated by their names, such as *alpestris*, *carnea*, *grandiflora*, *latifolia*, or *paniculata* &c. There is also a white-flowered variety.

Culture &c. as above, p. 365.

S. sorbifolia.—A pretty Asiatic shrub 3–6 ft. high, with pinnate leaves and lance-shaped, sharply serrated leaflets. Flowers in July and August, white, sweet-scented, in clustered panicles.

Culture &c. as above, p. 365.

S. Thunbergi.—A beautiful Japanese shrub 1–3 ft. high, with smooth, linear lance-shaped, sharply serrated leaves, changing to brilliant crimson in autumn. Flowers in April, white, in great profusion.

Culture &c. as above, p. 365.

S. tomentosa.—A N. American shrub about 3 ft. high, with rusty tomentose stems, and ovate or oblong serrate leaves, woolly beneath. Flowers in July, rosy or rarely white, in dense panicles.

Culture &c. as above, p. 365.

S. trilobata. — This is a handsome shrub 1–2 ft. high, native of the Altaian Mountains. Leaves roundish, lobed, crenated, smooth. Flowers in May, pure white, in numerous compact corymbs.

Culture &c. as above, p. 365.

S. Van Houttei.—A beautiful bush 5–8 ft. high, said to be a cross between *S. media* and *S. trilobata.* In late spring it produces masses of pure white bloom almost hiding the deep green foliage. After flowering the shoots that have borne blossoms should be thinned out, and new shoots will break away and produce an abundance of bloom the following season. This Spiræa is now grown rather extensively in pots and gently forced into early blossom in greenhouses.

Culture &c. as above, p. 365.

NEILLIA (NINE BARK).—A genus of 4 or 5 species of branching shrubs, with simple or variously lobed and toothed leaves, and large deciduous stipules. Flowers in racemes or panicles, hermaphrodite. Calyx more or less bell-shaped, 5-lobed. Petals 5, inserted at the mouth of the calyx, shortly clawed. Stamens 10 or more, inserted with the petals. Carpels 1–5, sessile or shortly stalked, free or connate.

Culture and Propagation. — These plants thrive in rich loam, but do well in ordinary soil, and are suitable for shrubberies, borders, or grassland. They may be increased by cuttings of almost ripe wood, inserted in sandy soil under a glass. Seeds are also ripened freely in ordinary good seasons and may be sown in cold frames as soon as ripe. In spring, the seedlings may be transplanted to light rich soil, in warm and sheltered spots.

N. amurensis (*Spiræa amurensis*).—A native of Amur 4–7 ft. high, with somewhat cordate-roundish 3–5-lobed leaves; lobes acute, sharply serrate, white and downy beneath. Flowers in summer, white; filaments of stamens reddish.

Culture &c. as above.

N. opulifolia (*Spiræa opulifolia*).—A beautiful N. American shrub 5 ft. high, with roundish somewhat palmately 3-lobed and heart-shaped leaves. Flowers in June, white, in umbellate corymbs, succeeded by purplish fruits. The variety *lutea* has beautiful yellow-tinted foliage, looking well in the distance. The variety

mollis (formerly known as *Spiræa capitata*) is a form with downy leaves.
Culture &c. as above.

N. rubiflora and **N. thyrsiflora**, natives of Nepaul, are not yet well known, nor are they quite hardy in northern parts of this country. The last-named species is a Spiræa-like bush about 2 ft. high with bright purple-red stems, and lobed and serrate leaves which assume beautiful purple tints in autumn.
Culture &c. as above.

N. Torreyi (or *Spiræa monogyna*) resembles *N. opulifolia*, but has a more compact habit, and grows only 2–3 ft. high.
Culture &c. as above.

STEPHANANDRA.—A genus with only 2 or 3 species of shrubs, with alternate leaves and hermaphrodite flowers. Calyx lobes and petals 5. Stamens 10.

Culture and Propagation.—This is practically the same as for the Shrubby Spiræas. The plants like a rich loamy soil thoroughly well-drained and rather moist than dry on the whole. The addition of a dressing of manure every autumn or winter is very beneficial. They may be increased by dividing the roots in early autumn, or in mild weather in spring. Cuttings of the half-ripened shoots will also root about August in sandy soil under a handlight, and the plants thus obtained may be transferred to the open air the following spring.

S. flexuosa (*Spiræa incisa*). — A deciduous Japanese shrub, with alternate, stalked, incised or pinnatifid leaves, 1½–3 in. long, somewhat triangular in outline, and downy beneath. Stipules leafy, persistent. Flowers in July, white, small, in corymbose panicles or racemes.

Culture &c. as above. When well-grown this is a graceful bush 3–8 ft. high, with long arching shoots and prettily cut foliage. It is best grown in masses by itself or even as single specimens on the grass. It sends out suckers freely from the roots, and may be also increased by this means.

S. Tanakæ.—A Japanese shrub somewhat coarser growing and more fleshy than *S. flexuosa*, and with larger leaves 4–5 in. long, sharply toothed, but not deeply lobed. Flowers small and greenish, in loose panicles, not very attractive.
Culture &c. as above.

EXOCHORDA (PEARL BUSH). — A genus with only one or two species of shrubs closely related to the Spiræas in character.

E. grandiflora (*Spiræa grandiflora*).—A handsome Chinese shrub, 6 ft. high, with stalked, lance-shaped oblong entire or serrulate leaves and no stipules. Flowers in May, polygamous diœcious, white, large, in axillary racemes. Calyx bell-shaped, 4–5-lobed, rounded. Petals 4–5, large, or rounded, shortly clawed. Stamens 15, short, inserted at the mouth of the calyx. Carpels 5, immersed in the calyx tube but free from it; when ripe, hoary, compressed, ribbed.

E. Alberti is a recently introduced species from Persia, scarcely yet known, although grown at Kew. It is quite hardy and a vigorous grower, and reaches a height of 10–12 ft., very much resembling *E. grandiflora* in appearance. The leaves however are larger and of a brighter green, and the scentless flowers are of a purer white but not quite so large. As stated above, there are 15 stamens in the flowers of *E. grandiflora*, but in *E. Alberti* there are 25, arranged in 5 bundles.

Culture and Propagation.—The Pearl Bush likes a warm rich loam and a somewhat sheltered position. It may be increased by seeds, layers, cuttings of the half-ripened branches, or suckers from the roots. It is a graceful plant for small groups on the grass, and when it bears its white blossoms, each about 1½ in. across, it reminds one of a small single-flowered Rose.

GILLENIA.—A genus with 2 species of erect hairy perennials, with almost sessile 3-foliolate leaves and axillary or terminal hermaphrodite flowers on long stalks. Calyx tube cylindrical, 10-nerved, with 5 erect teeth. Petals 5, linear lance-shaped. Stamens 10–20. Carpels 5, distinct or united. Follicles 5, leathery.

Culture and Propagation.—Gillenias are natives of N. America and thrive in moist peat and loam in partial shade, and may be grown under taller plants in the shrubbery. They may be increased by dividing the roots in spring every three or four years when the plants have made good clumps. Seeds may also be sown as soon as ripe in cold frames, and the seedlings transplanted in mild weather the following spring.

G. stipulacea. — A perennial 1-2 ft. high, with lanceolate deeply cut leaves, and white flowers in June.

Culture &c. as above, p. 369.

G. trifoliata (*Spiræa trifoliata*).—A Spiræa-like plant about 1½-2 ft. high, with 3-parted leaves, and linear, entire, pointed stipules. Flowers in June and July, red or white.

Culture &c. as above, p. 369.

KERRIA (Jew's Mallow).—A genus with one or two species of slender-stemmed deciduous shrubs with stalked, simple, long pointed, largely and unequally toothed leaves, linear awl-shaped stipules, and large yellow, solitary, stalked flowers at the ends of the branches. Petals 5, broad oblong or rounded, shortly clawed. Stamens numerous. Carpels 5-8, dry, indehiscent.

K. japonica.—A pretty Japanese shrub 3-4 ft. or more high, with bright green, shining leaves, rather smooth above, paler and slightly hairy beneath. Flowers in spring and early summer, orange-yellow, numerous. The double-flowered variety is best known and is usually seen trained to walls. It looks well, however, grown as a bush, the slender arching stems being covered with yellow blossoms. There is a beautiful variety with leaves variegated with sea-green, pale yellow and white.

Culture and Propagation. — Kerrias thrive in any good soil. They may be increased by layers, division of the roots in early autumn or spring, or by cuttings of the young shoots in sandy soil under a glass. After flowering the old wood may be cut out where necessary and the young shoots exposed to the light and air as much as possible.

RHODOTYPOS (White Jew's Mallow). — A genus with one species described below, with the generic characters :—

R. kerrioides.—A charming deciduous Japanese shrub, 5-15 ft. high, with decussately opposite, stalked, ovate, pointed, deeply serrated leaves, silky beneath. Flowers in May, white, hermaphrodite, solitary, on short stalks at the ends of the branches, numerous. Calyx lobes 4, large, leafy, deeply serrated. Petals 4, large, rounded, shortly clawed. Stamens numerous. Carpels 1-4, drupe-like, rown, shining, 1-seeded.

Culture and Propagation. — This species may be grown like the Kerria, either as a bush or wall plant. It is increased in the same way by layers, division of the roots in early autumn or early spring, or by cuttings of the young shoots, and likes similar soil. Seeds are also ripened freely in favourable seasons, and if sown in cold frames as soon as ripe, or in gentle heat in spring, will produce young plants which may be pricked out and transferred to the open ground when strong enough.

NEVIUSIA (Alabama Snow Wreath). Another genus with only one species. The following description includes the generic characters :—

N. alabamensis. — A somewhat rare and beautiful United States shrub with alternate, stalked, ovate or oblong, doubly serrate leaves, and small free stipules. Flowers rather large, hermaphrodite, white or yellowish-green, on slender stalks along the length of the branches. Calyx 5-lobed, lobes leafy, serrated. Petals none. Stamens numerous, conspicuous. Carpels 4. Drupes 4, Pea-like.

Culture and Propagation.—At Kew this plant flowers freely in the open air, and it will probably prove hardy in most parts of the country. It thrives in warm loamy soil, and may be treated like *Neillia* or *Rhodotypos.* Propagation may be effected by means of cuttings of the half-ripened shoots in sandy soil under a hand-light, or the lower branches may be layered in autumn and severed from the parent plant the following year when well rooted.

ADENOSTOMA.—A genus with 2 species of rigid, branched shrubs, with Heath-like, linear, leathery, entire leaves, solitary or clustered. Flowers hermaphrodite, racemose or paniculate. Calyx obconic, bell-shaped, 10-ribbed, leathery, 5-lobed. Petals 5, round. Stamens 12 (or 8-15). Fruit a leathery achene.

A. fasciculata. — A Heath-like Californian evergreen bush about 2 ft. high, with the characters above described.

Culture and Propagation.—It thrives in a peat and loamy soil, and may be increased by cuttings of the young shoots in sandy soil under glass. This plant is very rarely seen.

Tribe III. QUILLAJEÆ.—Trees or shrubs with simple, rarely pinnate leathery leaves. Calyx lobes often persistent. Stamens 5–10–20. Carpels free or united. Fruit follicular, or a coccus or capsule.

LINDLEYA. — A genus with one species, the description of which below includes the generic characters.

L. mespiloides.—A beautiful Mexican Medlar-like tree, 20–30 ft. high, with simple crenulate leathery leaves, and small awl-like stipules. Flowers in July, hermaphrodite, white, sweet-scented, axillary or at the tips of the shoots. Calyx persistent, 5-lobed; petals 5, roundish, sessile, large. Stamens 15–20, inserted at the mouth of the calyx. Carpels 5. Capsule woody, oblong, 5-angled or furrowed.

Culture and Propagation.—In the southern and milder parts of the country this evergreen tree will doubtless prove hardy. It likes well-drained loamy soil with a chalky bottom. It may be increased by cuttings under glass, or by grafting on the Common Hawthorn. It is a plant very rarely seen.

EUCRYPHIA. — A genus with 3 species of smooth or woolly resinous trees, with opposite, leathery, evergreen, simple or pinnate, entire, toothed or crenate leaves. Sepals 4, oblong, concave, cohering at the tips. Petals 4, large, somewhat hypogynous, broadly obovate rounded, straight or oblique. Stamens very numerous. Capsule leathery or woody, 5–12-furrowed.

Culture and Propagation. — The species described below like a warm loamy or peaty soil and somewhat sheltered positions, especially in northern parts, in beds by themselves on grass or in borders. They may be increased by ripened cuttings inserted in sand under glass and protected during the winter months.

E. Billardieri Milligani is a beautiful white-flowered evergreen shrub, recently introduced to cultivation from Tasmania. It is somewhat tender, and will scarcely succeed in the open air far beyond the Midlands.

Culture &c. as above.

E. cordifolia.—A Chilian tree, 20 ft. high, with heart-shaped oblong, crenated, downy leaves. Flowers large, white, axillary, solitary, stalked.

Culture &c. as above.

E. pinnatifolia. — A distinct and beautiful shrub 2–3 ft. high, also native of Chili, with pinnate leaves composed of ovate serrate or toothed leaflets. Flowers white, large, about 3 in. across, usually in pairs near the ends of the shoots, and having a cluster of numerous stamens in the centre. They are borne in July and August and give the plant an extremely handsome appearance.

Culture &c. as above.

Tribe IV. RUBEÆ.—Shrubs or undershrubs, often prickly; leaves often compound. Calyx lobes persistent. Stamens and carpels numerous. Drupes many, not enclosed by the calyx tube.

RUBUS (BRAMBLE).—A genus containing about 100 distinct species of creeping herbs, or climbing prickly shrubs, with alternate, simple, lobed, 3–5-foliolate or oddly pinnate leaves, with stipules adnate to the stalks. Calyx lobes 5, persistent. Petals 5. Stamens and carpels usually numerous. Fruit consisting of fleshy drupes aggregated on a conical receptacle (well seen in the Common Raspberry).

Culture and Propagation.—From a flower garden point of view, only a few of the best Brambles are worthy of cultivation, and even they are chiefly useful for clothing unsightly banks or walls or rougher parts where little else will grow, or where choicer plants would be out of place. They have the great advantage of flowering freely and growing in the poorest of garden soils, although of course the better the soil, the more vigorous will the plant be. They are easily increased by suckers, division, layers, or seeds. The latter may be sown as soon as ripe either in cold frames for the more tender kinds, or in the open border for the hardier ones. The seedlings may be transplanted in spring during mild weather. It is, however, much quicker to divide the roots, or replant suckers, or to detach the rooted layers.

Besides the kinds described below there are many others to be found in botanical collections such as Kew, but they are scarcely worth mention here from a flower garden point of view.

The Raspberry (*R. Idæus*) is treated separately at p. 1085.

R. arcticus. — A small non-prickly species about 6 in. high, native of the Arctic regions. Leaves 3-foliolate with rhomboid-ovate coarsely toothed leaflets. Flowers in June, rose-pink, useful for the rock garden.

Culture &c. as above.

R. australis.—A distinct-looking New Zealand climber with prickly stems and practically no leaves as popularly understood. There is, however, great variation in regard to these, as some forms have large deep shining green leaves, composed of 3–5 leaflets with coarsely toothed margins. Flowers in early summer, pink or white, fragrant, about ½ in. across. Fruit yellow, juicy. This is not quite hardy in all parts, and should be trained up a south wall.

Culture &c. as above.

R. biflorus.—A tall prickly Himalayan species, with whitish stems, leaflets 3–5, ovate, doubly toothed, downy or hairy above, white and woolly beneath. Flowers in May, white, ½–¾ in. across. Fruit golden-yellow.

Culture &c. as above. Even in a leafless condition in winter, this species cannot fail to attract attention, as its cane-like stems stand out clearly on the landscape, being so white that the uninitiated are apt to imagine them to be white-washed.

R. Chamæmorus (*Cloudberry*). — A non-prickly British species 4–8 in. high. Leaves 5–7-lobed, crenate, wrinkled. Flowers in summer, white, 1 in. across; sepals hairy. Fruit orange-yellow, ½ in. in diameter.

Culture &c. as above.

R. deliciosus. — A beautiful North American climber, with roundish, kidney-shaped, wrinkled leaves slightly 3–5-lobed, finely serrated. Flowers in May, purple, about 2 in. across, produced in great abundance. Fruit large, delicious flavour.

Culture &c. as above. This may be grown as a shrub by cutting back the shoots. It is very ornamental when in bloom and may be used in clumps by itself or in the shrubbery in an open situation.

R. fruticosus (*Blackberry; Bramble*). A well-known prickly denizen of British and Irish hedges, copses, and waste places, with beautiful white or pink flowers, and large black or reddish-purple fruits, excellent either in a raw, cooked, or preserved state. The double white and double pink varieties with flowers like rosettes are very pretty and well worth having in any Bramble collection. There is also a form with variegated leaves. Some of the American varieties, like *Lawtons*, *Kittatinny*, *Mammoth*, do not thrive in this country, but the *Parsley-leaved Blackberry* grows very well.

Culture &c. as above.

R. japonicus tricolor.—A handsome Japanese trailer with slender stems, and leaves with 3-lobed toothed or serrate margins, and remarkable for their pretty white and green marbling, mixed with soft rosy-pink. The young leaves look particularly handsome.

Culture &c. as above. This is a newly introduced Bramble and will no doubt prove quite hardy, at least in the mild southern and western parts of the kingdom.

R. laciniatus. — A distinct, prickly, straggling species with leaves composed of 3–5 dissected and sharply serrated leaflets somewhat downy beneath. Flowers from June to September, white or rosy; petals 3-lobed at the apex.

Culture &c. as above.

R. lasiostylus.—A Chinese species 4–5 ft. high, densely set with prickles, and covered with a bluish-white bloom. Flowers in summer, small, reddish-purple.

Culture &c. as above.

R. leucodermis.—A native of N.W. America somewhat like *R. biflorus*, but it is not such a strong grower, nor are the prickly stems so white, but more distinctly bluish. Flowers white. Fruit yellowish-red, with a good flavour.

Culture &c. as above.

R. neglectus.—A N. American plant supposed to be a hybrid between *R. occidentalis* and *R. strigosus*. It has stout prickly stems about 8 ft. high covered with a white or bluish-white bloom. Flowers white. Fruit dark red.

Culture &c. as above.

R. nutkanus. — A native of Nootka Sound, with hairy, flexuous stems 1–10 ft. long. Leaves 5-lobed, coarsely and unequally toothed. Flowers in August, white, large, followed by red fruits.

Culture and Propagation. — This species thrives near water or in moist soil, and may be increased in the ways mentioned above. It ripens seeds freely in the British Islands.

R. occidentalis (*Thimbleberry* or *Black Raspberry*). — A native of the Eastern United States and Canada, with dull bluish-white arching stems 5–6 ft. high. Flowers white, succeeded by purple-black fruits.

Culture &c. as above.

R. odoratus (*Purple Virginian Raspberry*). — A non-prickly N. American species 3–5 ft. high, with 3–5-lobed leaves, minutely toothed. Flowers from June to August, purple-rose, 2 in. across, many on a stalk.

Culture &c. as above.

R. phœnicolasius (*Japanese Wineberry*).—A tall-growing Japanese species covered with stiff glandular purple-red hairs. Leaves 5–7 in. long, 3-foliolate or simple; leaflets crenate-serrate, downy white beneath. Flowers in June, pale pink, succeeded by scarlet fruits ¾ in. long, to which birds are very partial.

Culture &c. as above.

R. rosæfolius.—A Himalayan species, fit only for the mildest parts of the country. Leaflets 5–7, ovate lance-shaped, pointed, deeply serrated. Flowers in August, white, about 1 in. across. Fruit orange-red. The double variety *coronarius* is a great improvement on the type, but is likewise tender. It makes pretty specimens if grown in small pots in the greenhouse during the winter months. According to the 'Kew Handlist' this variety is now known as *R. thyrsoides fl. pl.*, but the name *rosæfolius* is very descriptive of the foliage and is retained here as it is much better known.

R. spectabilis (*Salmon Berry*). — A dense, erect-growing, North American bramble 6–10 ft. high. Leaves 3-foliolate; leaflets ovate pointed, deeply cut, and serrate. Flowers in May, bright red or purple, large. Fruit red, twice the size of the common Raspberry, but inferior in flavour.

Culture &c. as above.

R. strigosus. — A native of N.E. America with glaucous stems covered with bristles rather than prickles. Flowers white. Fruit red.

Culture &c. as above.

Tribe V. POTENTILLEÆ.—Herbs or shrubs. Calyx persistent bracteolate. Stamens and carpels usually numerous.

PURSHIA.—A genus containing only the following species, the description of which includes the generic characters:—

P. tridentata.—A pretty hardy evergreen shrub 2–3 ft. high, native of N.W. America. The branches are furnished with clusters of small alternate, somewhat wedge-shaped leaves cut into 3 linear lobes, with recurved margins and a whitish downy under surface. The short-stalked yellow flowers appear in summer. The persistent 5-lobed calyx is elongated tubular or funnel-shaped, and the corolla consists of 5 obovate clawed petals surrounding about 25 stamens in the centre.

Culture and Propagation.—This little-known shrub flourishes in ordinary good and well-drained garden soil of a somewhat sandy nature. It appears to be perfectly hardy, and may be increased by inserting cuttings of the young or half-ripened shoots in sandy soil under a bell-glass during the summer months.

CHAMÆBATIA.—This genus is also represented only by the one species described here:—

C. foliolosa.—A pretty evergreen shrub 2–3 ft. high, native of California. The young shoots are clothed with a glandular down and broadly ovate rather clammy leaves about 2 in. long, thrice pinnately cut or divided. The white flowers, about ¾ in. across, appear in summer in cymose clusters at the ends of the shoots. Calyx persistent with a bell-shaped or hemispherical tube, and 5 lobes. Petals 5, obovate. Stamens numerous in many series, inserted on the throat of the calyx.

Culture and Propagation. — This is a somewhat tender shrub and is scarcely hardy enough to be grown in the open air except in the milder parts of the kingdom. It flourishes in good well-drained garden soil, or rich sandy loam, with a little peat or leaf mould added, and may be increased by cuttings of the half-ripened shoots inserted in sandy soil under a handlight or in a cold frame.

DRYAS (MOUNTAIN AVENS).—A genus with 2 species of pretty dwarf tufted, shrubby plants, with simple, stalked, oblong, entire, crenate, or somewhat pinnatifid leaves, shining above, white beneath. Stipules adnate to the leaf stalk. Flowers on slender, erect scapes, solitary. Calyx tube short, glandular hairy. 8–9-lobed. Petals 8–9, broadly obovate. Stamens and carpels numerous. Achenes with slender feathery tails.

Culture and Propagation.—These plants thrive in moist peaty soil, and may be increased by cuttings inserted in sandy soil in spring under glass; by division of the roots in early autumn, or better still in spring when growth is commencing; or from seed sown in spring in the open border in mild weather, or early in autumn as soon as ripe in cold frames. The seedlings are best wintered in cold frames the first season so as to enable them to become strong and sturdy before transferring to the moist parts of the rockery or edges of borders.

D. Drummondi.—A rare N. American evergreen trailer, with elliptic deeply crenate leaves, white beneath. Flowers in June, golden-yellow, about 1 in. across.

Culture &c. as above.

D. lanata (*D. nivea*).—This is a curious Tyrolese form of *D. octopetala* with much narrower and whiter leaves. The flowers are rather smaller than those of *D. octopetala*, but are more freely produced, and the whole plant is more vigorous.

Culture &c. as above. Growing naturally on the sunny slopes of the southern Tyrol, this plant requires open sunny situations and will flourish in well-drained sandy loam. It may be increased by seeds or division.

D. octopetala (*D. depressa*).—A dwarf tufted British plant with obovate coarsely toothed leaves about 1 in. long, hoary beneath, shining above. Flowers in May and June, white, with conspicuous yellow stamens in the centre. Calyx very hairy. There is a pretty little form called *minima* useful for the rock garden.

Culture &c. as above.

FALLUGIA.—A genus represented only by the following species:—

F. paradoxa (*Sieversia paradoxa*).—An erect much-branched shrub 4 ft. or more in height, native of California and Mexico. The alternate stalked leaves are more or less irregularly cut into 3–5 linear blunt lobes with recurved margins and a snowy-white under surface. The large white showy flowers are borne either solitary at the ends of the shoots or in small panicles. The persistent calyx tube is obconical or hemispherical, with 5 ovate 3-toothed or tailed lobes. Petals 5 obovate roundish. Stamens and achenes numerous, the latter ending in feathery tails.

Culture and Propagation.—This is not a well-known plant. It flourishes in ordinary good garden soil, and likes warm sheltered and sunny situations. In the northern and bleaker parts of the kingdom it would probably be unable to stand a hard winter unless well protected with mats. It may be increased by seeds if obtainable, sown as soon as ripe in cold frames, or by means of cuttings of the half-ripened shoots inserted in sandy soil under a handlight in summer.

GEUM (AVENS).—A genus with about 30 species of perennial herbs with tufted pinnate radical leaves, having a very large terminal lobe. Stipules sheathing and adnate to the base of the leaf stalk. Flowers solitary or corymbose. Calyx persistent with 5 bracteoles below the 5 lobes. Petals 5, rounded or obovate. Stamens and carpels many.

Culture and Propagation.—Geums are easily grown in any fairly rich loamy soil. They are excellent border or rock plants, and like plenty of sun above, and moisture at the roots during hot summers. Propagation is mostly easily effected by dividing the roots or clumps in early autumn, or in spring as growth commences, when the plants have made large masses, and would be benefited by the process. Seeds are freely ripened by most of the kinds, and may be sown as soon as ripe either in cold frames or in sheltered spots in the open border, afterwards pricking the seedlings out in spring about 1 ft. apart. Seeds may also be sown in the open air in spring, and the seedlings transplanted early in autumn.

G. chiloense. — A beautiful hairy perennial 1–3 ft. high, native of Chiloe. Leaves pinnate, with crenate-serrated leaflets. Flowers in summer, scarlet, sometimes shaded with bronze. The variety *grandiflorum* has flowers of a dazzling scarlet; *miniatum* is also a splendid variety with brilliant flowers, while the double or semi-double flowered form is equally handsome and brilliant in colour.

Culture &c. as above. The species and varieties mentioned are among the very finest of the Geums and should find a place in the herbaceous border for the great brilliancy of their flowers. They are all easily increased by dividing the rootstocks early in autumn or in spring. Any specially fine form is best increased in this way, as seedlings have a great tendency to vary from the parent plant.

G. coccineum. — A native of S.E. Europe, 6–12 in. high, rather rare, but often mixed up with the preceding species. Leaves large, lyrate-pinnatifid with 5-7-toothed leaflets. Flowers in summer, scarlet, with roundish obcordate petals. *Heldreichi* is a Greek form with deep orange-red flowers. There is also a form with semi-double bright scarlet flowers.

Culture &c. as above.

G. elatum. — A pretty Himalayan species with pinnately cut leaves the segments of which are roundish oblong and irregularly toothed. Flowers in summer, golden-yellow, on long slender stalks.

Culture &c. as above.

G. macrophyllum.—A North American species 9–12 in. high, with leaves ending in a large roundish heart-shaped lobe, and having a few golden-yellow flowers on the stem.

Culture &c. as above.

G. molle.—A native of the Servian and Balkan mountains closely related to *G. pyrenaicum*, from which it differs in having smaller and more softly hairy leaves of a bright green colour, and larger bright yellow blossoms in June.

Culture &c. as above.

G. montanum.—A native of the Alps 6–12 in. high, with softly hairy, incised leaves. Flowers in summer, 1½ in. across, yellow, on stems 9–18 in. high, succeeded by a cluster of feathery tailed seeds of a reddish-brown colour. There is a large-flowered variety called *grandiflorum*, and a brilliant orange-coloured one called *aurantiacum*.

Culture &c. as above. It likes warm spots in the border or rockery fully exposed to the sun.

G. pyrenaicum. — A hairy Pyrenean perennial about 1½ ft. high. Lower leaflets small, ovate, toothed. Flowers in June, yellow, nodding, 1–4 on a stem.

Culture &c. as above.

G. radiatum.—A handsome perennial, 12–18 in. high, native of the high mountains in Carolina. It has roundish, kidney-shaped leaves with radiating veins, and large bright yellow blossoms resembling those of *G. montanum*.

Culture &c. as above.

G. reptans.—This pretty species is really the rock form of *G. montanum*. It grows in the clefts of rocks and in rocky débris on the higher Alps at an elevation of 6000–7500 ft. and is also native of the Pyrenees and the mountain ranges of Eastern Europe. The plant sends out long thread-like runners, at the tips of which are small buds or shoots which take root. The grey-green velvety leaves are more deeply and finely divided than those of *G. montanum*, and the flowers are larger, about 2 in. across, and of a soft yellow colour, appearing in summer, and afterwards followed by purple hairy seed heads.

Culture &c. as above. It flourishes in moist well-drained gritty, but not calcareous, soils.

G. rhæticum.—A native of the Swiss Alps, 6–9 in. high, with hairy lyrate and pinnately cut bright green leaves. The bright yellow flowers, an inch or more across, are usually produced singly on the top of the stem, with 2 or 3 reduced leaves or bracts beneath.

Culture &c. as above.

G. rivale (*Water Avens*).—A British plant 1–3 ft. high, found by the banks of streams &c. Leaves variable, pinnate, with more or less obovate toothed leaflets. Flowers from May to July, 1–1½ in. across, yellow or orange.

Culture &c. as above. May be grown in marshy places in the rockery, or near streams, pools &c.

G. strictum.—A distinct species with a wide geographical distribution, being found on the Caucasus, in Siberia, and North America. It grows 2–2½ ft. high, and has oval pinnate leaves covered with soft hairs, and produces an abundance of golden-yellow flowers during the summer months.

Culture &c. as above.

G. triflorum (*Sieversia triflora*).—A pretty N. American perennial with interruptedly pinnate leaves 4–6 in. long, with deeply serrated leaflets. Flowers in summer, white, tipped and edged with purple-red, or purplish, on hairy stems 8–12 in. high. Calyx dark purple.

Culture &c. as above. It likes a moist and rather light soil in partially shaded spots in the rockery or border.

WALDSTEINIA.—A genus with 4 species of creeping perennial Strawberry-like herbs. Calyx persistent, 5-lobed, with 5 minute bracteoles. Petals 5, obovate. Stamens many. Achenes dry or fleshy, downy or hairy.

Culture and Propagation.—These plants grow well in ordinary soil and are suitable for the rockery. They may be increased by seeds or division in spring or in early autumn. Seeds may be sown when ripe in cold frames or in the open border in sheltered spots, and the seedlings may be pricked out in mild weather in spring. Seeds may also be sown at the latter period and the seedlings transplanted in mild showery weather in early autumn. The plants, however, are so very easily divided that it is scarcely worth while to go to the trouble of raising them from seed, unless a very large number of plants are required.

W. fragarioides (*Barren Strawberry*). A showy N. American perennial with bright red hairy stems about 6 in. high, with ternate leaves, and obovate irregularly toothed leaflets. Flowers in early summer, bright yellow, about ½ in. across.

Culture &c. as above.

W. geoides.—A dwarf tufted Hungarian perennial 4–6 in. high, with palmately 3–5-lobed and toothed leaves. Flowers in May and June, small, yellow, numerous, usually in terminal pairs.

Culture &c. as above.

W. trifolia.—A native of E. Europe 4–6 in. high. Leaves 3-lobed with shortly stalked hairy leaflets. Flowers in April and May, rich golden-yellow. *W. sibirica* from Siberia appears to be a form of this species.

Culture &c. as above. This is a charming plant for trailing over rocks, and looks much better grown in this way than as a flat patch in the rockery.

FRAGARIA (STRAWBERRY).—A genus with only a few species of silky or hairy perennial herbs, with runners or stolons. Leaves 1–3-foliolate or pinnate. Flowers polygamous-diœcious. Calyx persistent, 5-lobed, 5-bracteolate. Petals 5, broadly obovate, shortly clawed. Stamens many, persistent. Carpels many, distinct, on a fleshy convex receptacle, which in the case of the Strawberry is eaten as the fruit.

Culture and Propagation.—The Strawberries for the flower garden are easily grown in ordinary soil not too wet or cold, and are easily increased by dividing the rootstocks or the runners. The plants may be utilised for the ornamentation of rockeries, old ruins, walls &c. The Strawberry proper is treated upon at p. 1088.

F. chilensis.—A pretty S. American species about 1 ft. high, with obovate, serrate, wrinkled leaflets, silky beneath. Flowers in April and May, white, on thick silky stalks. Fruit rosy, white-fleshed. The variety *grandiflora* (known as the Pine Strawberry) has glaucous leaves hairy beneath, and somewhat larger flowers than the type.

Culture &c. as above.

F. indica, with golden-yellow flowers, and the various forms of the white-flowered Wild Strawberry (*F. vesca*) are useful in conjunction with the above for the rockery or chinks of old walls.

Culture &c. as above.

POTENTILLA (CINQUEFOIL).—A genus with about 120 species of smooth, hairy or silky tomentose perennial herbs or undershrubs, rarely annuals. Leaves digitately 3–7-foliolate or oddly pinnate, with stipules adnate to the base of the stalk. Flowers in corymbose cymes, rarely axillary and solitary. Calyx persistent, usually 5-lobed, with 5 bracteoles. Petals 5, rarely 4, obovate roundish, or linear spathulate. Stamens, carpels, achenes many.

Culture and Propagation.—Potentillas prefer a sandy soil. Many of them are useful for rockeries, banks &c., and a few of the best make splendid border plants. They may be increased by dividing the rootstocks or by sowing seeds in spring in the case of the single-flowered kinds. The double-flowered varieties are best increased by division, as they do not usually seed so freely as the single ones, and also because seedlings rarely come with the true characters of the parent plants.

The Double Potentillas are by far more beautiful garden plants than the natural species. Grown in a light deep soil with plenty of sun they make glowing pictures in the flower garden from June to September. Although the flowers are more or less double, and resemble small Roses, they ripen some seeds, and from these new forms may be obtained by those in search of novelties.

These double-flowered forms are the result of crossing the *atrosanguinea* form of *P. argyrophylla* with forms of *P. nepalensis*, and it is remarkable that these Himalayan species have produced such a fine hardy race of ornamental flowers.

The following is a list of the best double Potentillas:—

Californe, large golden-yellow; *Candidat*, brick-red, suffused gold; *Carnival*, orange-yellow, flaked crimson; *Cendrillon*, red, shaded yellow; *Chinois*, very large rich maroon and yellow; *Chromatella*, clear yellow, effective; *Congo*, dark maroon and yellow; *Don Quixote*, soft yellow, splashed scarlet; *Eldorado*, scarlet-crimson, shaded gold; *Feu Follet*, orange-scarlet, with broad orange margin; *Golconde*, rich crimson, suffused and edged gold; *Jupiter*, vivid crimson, suffused yellow; *Le Vésuve*, vermilion, flushed and blotched golden; *L'Achéron*, brilliant velvety red and yellow; *Madame Rouillard*, rich velvety scarlet, edged golden, very large flowers; *Marron d'Inde*, maroon and yellow; *Melpomene*, bright yellow, shaded orange-scarlet; *Milton*, yellow, heavily blotched bright red; *Orphée*, beautiful self-yellow; *Panorama*, chrome-yellow, striped purple; *Purpurea plena*, rich deep purple-crimson; *Purpurea lutea plena*; *Richesse*, fiery scarlet, splashed gold; *Toussaint l'Ouverture*, rich velvety scarlet, tipped gold; *Van Dyck*, yellow, striped red; *Vase d'Or*, canary-yellow; *Velours Pourpre*, dark velvety purple, large double flowers; *Versicolor*, crimson-scarlet, shaded orange; *Vulcan*, rich deep crimson; *William Rollison*, glowing scarlet shading to orange-yellow, very showy and handsome.

P. alba.—A dwarf procumbent species 3–6 in. high, native of the Alps, with silvery leaves and large white flowers 1 in. across, from February to August.

Culture &c. as above.

P. alchemilloides.—This is a native of the chalky mountain districts of the Pyrenees, and grows 6–12 in. high, with ascending stems, and leaves composed of 5–7 oblong oval leaflets. The pure white flowers appear in great abundance from June to August.

Culture &c. as above.

P. alpestris.—A somewhat rare British plant 6–12 in. high, with rather hairy leaves, composed of 5 leaflets, and bright yellow flowers 1 in. across, in early summer.

Culture &c. as above. It likes a deep moist soil.

P. ambigua.—A creeping Himalayan species 6 in. high, with masses of leaves forming a green carpet on the ground. Flowers in June, rich yellow, 1 in. across, just overtopping the foliage.

Culture &c. as above.

P. anserina (*Silver Weed*).—A pretty and distinct species, native of the Northern temperate hemisphere, being found growing naturally in moist sandy soil in most parts of Europe, N. Asia, and N. America. It has a creeping rootstock, and interruptedly pinnate leaves composed of many deeply serrate or pinnately divided leaflets, the under surface of which is clothed with soft silky white hairs, which give them a silvery appearance. The solitary yellow flowers ½–¾ in. across are freely produced in July and August.

Culture &c. as above. This species may be used for covering the sides of banks or slopes, or for furnishing waste places.

P. apennina (*P. Bocconi*).—A dwarf tufted species, native of the pastures high up on the Apennines. The leaves are composed of 3 oval leaflets, and the large flowers of a bright yellow colour are borne in summer.

Culture &c. as above. Suitable for the border or rockery in open sunny places. It likes a mixture of peat, loam, and sand.

P. argentea. — A slender-growing species 6–12 in. high, native of the dry mountainous regions of Europe, Asia Minor, Siberia, and N. America. The leaves are composed of 5 obovate leaflets, greyish-green above, silvery-white beneath. The small yellow flowers are borne in a terminal panicle from June to September.

There are several forms of this species, and a hybrid between it and *P. verna* also exists. *P. collina*, a native of Bohemia, is closely related.

Culture &c. as above, p. 376.

P. argyrophylla (*P. insignis*). — A pretty Himalayan species 1½–3 ft. high, with silky, silvery, sharp-toothed leaves. Flowers in summer, yellow, over 1 in. across. The variety *atrosanguinea* has beautiful dark crimson flowers, and there is also a fine double-flowered form of it from which most of the garden forms are derived.

Culture &c. as above, p. 376.

P. aurea. — A very dwarf tufted species scarcely more than 1–2 in. high. It is a native of the European mountain ranges at elevations of 3000 to 6000 ft. The palmate leaves have 5 oblong lobes edged with silky silvery hairs. The large golden-yellow flowers, spotted with orange at the base of each petal, are borne in loose panicles from May to July.

P. baldensis from the Tyrolese Alps is closely related, but may be distinguished by its denser habit, smaller and more numerous yellow flowers, and hairy leaves.

Culture &c. as above. Suitable for the rock garden, or for making a carpet in the flower border, in open sunny situations in sandy soil, with a little peat or leaf-mould added.

P. bifurca. — A Caucasian species in the way of *P. anserina*, having thread-like rooting runners, and pinnate leaves composed of 3–7 pairs of oblong very downy leaflets. The bright yellow flowers are borne on an erect panicle 9–12 in. high from May to July.

Culture &c. as above, p. 376.

P. Calabra.—A native of S. Europe, with very silvery 5-lobed leaves, and lemon-yellow flowers about ¾ in. across, produced in early summer. This is closely related to *P. argentea*, and is practically only a form of it.

Culture &c. as above, p. 376.

P. canescens.—An erect-growing perennial 1–2 ft. high, native of the European mountain ranges. The grey-green leaves are composed of 5–9 leaflets, and are covered with a silvery down on the under surface. The yellow flowers are borne in broad clusters from May to July.

Culture &c. as above, p. 376.

P. caulescens. — A pretty species, native of the Alps, Apennines, Pyrenees &c., with leafy stems 6–9 in. long. The lower leaves are composed of 5 leaflets, the under surface and the margins of which are furnished with silky hairs. The white flowers appear in great profusion from June to August.

Culture &c. as above. A sunny crevice in the rockwork or in stony well-drained soil suits this species best.

P. chrysantha.—A native of the mountains of Central Europe, 1–2 ft. high, with downy leaves composed of 5–7 pairs of oblong toothed leaflets. The light yellow flowers are borne on a large panicle from May to August.

Culture &c. as above, p. 376.

P. cinerea.—A dwarf creeping species, native of the mountains of S. Europe and Asia Minor. The leaves are covered with a whitish down, and are composed of 4–5 thick leathery leaflets. The small bright yellow flowers are produced with great freedom from May to August.

Culture &c. as above, p. 376.

P. clusiana.—A small species 2–3 in. high, native of the chalky rocks of the Tyrol and Carpathian Mountains at an elevation of 3000–6000 ft. The 3–5 oblong leaflets which compose the leaves are covered with silky down, and the white flowers appear in May and June, 2 or 3 together at the top of the leafy stems.

Culture &c. as above, p. 376.

P. congesta (*Horkelia congesta*).—A Californian species 1–2 ft. high, with wedge-shaped oblong leaflets cut at the apex. Flowers in August, white, crowded on the stalks.

Culture &c. as above, p. 376.

P. delphinensis. — A dwarf tufted species 9–18 in. high, with digitate leaves made up of 5–7 lobes, green on both sides. The numerous bright yellow flowers are borne in summer, closely arranged on the panicle.

Culture &c. as above, p. 376.

P. Detommasi.—This is a large and handsome plant from the Macedonian mountains, closely related to *P. argentea*, from which it may be distinguished by its more ornamental foliage and its larger and more brilliant flowers.

Culture &c. as above, p. 376.

P. Fenzli.—A pretty little species 6-9 in. high, native of the mountains of Macedonia and Asia Minor. It has finely divided silky leaves clothed with a silvery down, and the small yellow blossoms are produced in close-set panicles in summer.

Culture &c. as above, p. 376.

P. frigida. — This handsome little species is a native of the Alps, Pyrenees, and Rocky Mountains, and has somewhat trailing or ascending stems clothed with hairy leaves which are composed of 3 olive-green leaflets. The small golden-yellow flowers are almost stalkless, and appear either solitary or in pairs at the tips of the shoots from June to September.

Culture &c. as above. This species likes well-drained gritty soil in the rock garden, and a sunny position.

P. fruticosa.—A British shrub 2-4 ft. high, with brown stems and somewhat digitately pinnate leaves, glaucous and silky when young. Flowers in June and July, bright yellow, about ¾ in. across, at the ends of almost every branch. The variety *prostrata* has trailing stems, and *davurica*, a Chinese form, has smooth leaves.

Culture and Propagation.—This is a very striking plant and when in full blossom is exceedingly attractive. The branches and leaves are almost hidden with the abundance of yellow flowers. It likes well-drained ordinary soil and plenty of moisture, and may be increased by seeds, or cuttings of the young shoots in spring.

P. grandiflora.—This fine species is a native of the pastures and alpine regions of Europe and Asia. It grows 6-12 in. high, and has 3-foliate leaves of a grey-green hue. From 3 to 10 large bright yellow blossoms are borne on an erect stalk from May to August.

P. pedemontana, from the Southern Alps, is closely related, but has a more spreading habit and smaller leaves covered with a silky down beneath.

P. minima is a pygmy form of *grandiflora* found on the limestone mountains of S. Europe at an elevation of 3000-6000 feet. The flowers are very small, and appear not only in May and June, but sometimes also in autumn.

Culture &c. as above. Easily increased by seeds and offsets.

P. heptaphylla.—An alpine species with spreading stems 6-12 in. high. The leaves are composed of 5-9 leaflets, and the large bright yellow flowers appear from May to August.

Culture &c. as above, p. 376.

P. hirta (*P. pedata*).—A handsome perennial 1½-2 ft. high, native of the mountains of S. Europe, and also found on the Atlas Mountains in N. Africa. The leaves are cut into 7 leaflets, and the rather large golden-yellow flowers continue to appear throughout the summer months.

P. astrakanica, *P. angustifolia*, and *P. obscura* are forms of this species.

Culture &c. as above, p. 376.

P. hopwoodiana.—A garden hybrid 1½ ft. high, with oblong wedge-shaped, coarsely toothed, hairy leaflets. Flowers in June and July, beautiful salmon-apricot, edged with bright rose.

Culture &c. as above, p. 376.

P. multifida. —A handsome species 6-12 in. high, native of the mountains of Central Europe and Asia. The leaves are much divided and cut up, deep green above, and covered with a white down on the under surface. The yellow flowers are borne on slender stalks from May to July.

Culture &c. as above, p. 376.

P. nepalensis (*P. formosa*).—A handsome velvety hairy perennial 12-18 in. high, with deep green leaves composed of 5-7 oval lance-shaped toothed leaflets. The brilliant rosy-carmine flowers are produced freely from May to August, having rosy filaments in the centre tipped with blackish anthers. There is a variety called *nana*, similar to the type, but of a dwarfer and denser habit of growth.

Culture &c. as above. This species is closely related to forms of *P. argyrophylla*—notably *atrosanguinea*—and in conjunction with them has probably been instrumental in originating the beautiful double-flowered garden forms.

P. nevadensis.—A small trailing species, native of the Sierra Nevada in

Spain, where it grows in the clefts of the rocks at an elevation of about 10,000 ft. The leaves are composed of 5 leaflets clothed with a short, soft, silvery down, and the pale yellow flowers appear in May and June.

Culture &c. as above, p. 376.

P. nitida.—A native of S. Europe forming broad silvery cushions or carpets scarcely 2 in. high. The leaves are composed of 3–5 shining, silvery, obovate or wedge-shaped leaflets. Flowers in summer, soft delicate rose, but of a much deeper tint in the variety *atrorubens.*

Culture &c. as above. Although this species is easily increased by dividing the tufts, it seems as if plants raised from seed are hardier, and better in every way. This species is remarkable for having pink flowers, the majority of the other species being yellow or white. There is, however, a white-flowered form of *nitida* proper.

P. nivea.— A dwarf tufted species about 2 in. high, native of the mountainous regions of Europe, Asia, and N. America. The whitish downy leaves are composed of 3 spreading leaflets, the under surface of which is snowy-white. Flowers yellow, from May to July.

Culture &c. as above. This species likes gritty peat and loam in half-shaded parts of the rockery.

P. opaca.—A native of the mountains of Central and N. Europe, N. Asia, and N. America. The branches trail on the surface of the soil, and are furnished with large leaves composed of 5–7 leaflets covered with soft hairs. The yellow flowers appear in May and June, apparently on the surface of the ground, on account of the trailing stems.

Culture &c. as above, p. 376.

P. pyrenaica. — A showy Pyrenean species 6–18 in. high, sometimes covered with adpressed hairs, sometimes nearly smooth. Leaves 3–5-lobed, velvety or rather smooth, the lower ones on long stalks. Flowers in summer, deep golden-yellow; petals very round, and overlapping.

Culture &c. as above, p. 376.

P. recta. — A rather stiffish erect-growing species 12–18 in. high, native of the European mountains, with leaves composed of 5-toothed leaflets, and bearing numerous large primrose-yellow flowers from May to September. There are several varieties of this fine species, the best known being *laciniata*, *macrantha*, and *palmata*.

Culture &c. as above, p. 376.

P. rupestris.—A native of the mountains of Central and S. Europe, with erect brownish stems 1½–2 ft. high, and pinnate leaves made up of 5–7 oblong toothed leaflets. The white flowers are borne in a loose panicle throughout the summer months.

Culture &c. as above, p. 376.

P. russelliana.—This is supposed to be a hybrid between *P. argyrophylla atrosanguinea* and *P. nepalensis.* In summer and autumn it bears its rich blood-scarlet flowers, nearly 2 in. across.

Culture &c. as above, p. 376.

P. Saxifraga.—A native of S. Europe 4–6 in. high. Leaves with 3–5 toothed or untoothed leaflets. Flowers in May and June, white, in corymbose heads.

Culture &c. as above, p. 376.

P. splendens. — A Pyrenean species with a short and rather woody branching rootstock, and slender stems forming a dense carpet scarcely 2 in. high. The 3–5 leaflets composing the leaves are of a glistening green above, with a silvery-white down beneath; and the beautiful white flowers appear singly on long stalks from May to July. Other white-flowered Potentillas are *P. Fragariastrum*, *P. petiolulata*, *P. micrantha*, and *P. pygmæa.*

Culture &c. as above, p. 376.

P. subacaulis.—A dwarf tufted species, native of the mountains of Europe, with branches spreading on the surface of the soil, and having leaves composed of 3 greyish downy leaflets. The yellow flowers appear from May to July, slightly above the trailing branches. Closely related to *P. cinerea* and perhaps only a form of it.

Culture &c. as above, p. 376.

P. unguiculata (*Ivesia unguiculata*). A pretty Californian perennial 9–12 in. high. Lower leaves 4–8 in. long, narrow-linear, with 3 closely packed leaflets clothed with silky white hairs. Flowers in July, pearly-white, ½ in. across, in slender, branched panicles.

Culture &c. as above, p. 376.

Tribe VI. POTERIEÆ.—Herbs or shrubs. Petals often absent. Stamens 1 or more. Carpels 1-3, enclosed by the calyx tube.

ALCHEMILLA (LADY'S MANTLE).—A genus with 30 species of erect or decumbent herbaceous perennials, with alternate, lobed, or palmate leaves. Calyx persistent, 8-10-lobed. Petals none. Stamens 1-4, inserted in the throat of the calyx. Carpels 1-4.

A. alpina.—A British plant 3-9 in. high, more or less clothed with silky hairs, except the upper surface of the 5-7-parted, roundish kidney-shaped leaves. Flowers from June to August, small, yellowish-green, in spiked and panicled cymes.

Culture and Propagation. — Alchemillas grow well in ordinary but well-drained soil, and are suitable for rock gardens chiefly on account of their silky foliage. They may be increased by dividing the roots, or from seeds sown in spring.

A. sericea. — A Caucasian species about 6 in. high, larger in every part than *A. alpina*, but otherwise very similar.

Culture &c. as above.

MARGYRICARPUS. — A genus with 8 species of rigid branching shrubs. Calyx persistent, 4-5-lobed. Petals none. Stamens 2-3. Carpel 1, enclosed in the calyx tube. Fruit a leathery achene.

M. setosus.—A native of the Andes, 2-4 ft. high, with oddly pinnate leaves, and deep green, awl-shaped, reflexed leaflets. Flowers throughout the summer, green, minute, axillary, stalkless, succeeded by small white fruits which form the chief attraction of the plant.

Culture and Propagation. — This pretty little evergreen is a good rock plant, and its masses of white fruits look charming against a dark background. It thrives in rich sandy loam with leaf mould, and may be increased by cuttings in summer, in sandy soil under a glass; or by layering the branches.

ACÆNA.—A genus with about 30 species of somewhat creeping or decumbent, smooth or silky perennials with alternate, oddly pinnate, deeply toothed, or much cut leaves. Flowers at the ends of the branches or spicate, small. Calyx 3-7-lobed, persistent. Petals none. Stamens 1-10. Carpels 1-2, enclosed in the calyx tube.

Culture and Propagation. — The Acænas on account of their compact habit and creeping character are chiefly useful for clothing rockwork, or dry parts of the flower border. They grow well in ordinary soil, and may be increased by seeds, divisions, cuttings, or portions of the creeping rootlets. Besides the species described below there are many others to be found in botanical collections.

A. adscendens.—A Patagonian species with long creeping stems and ascending branchlets clothed with pinnate leaves which are silky beneath, and divided into elliptic obovate toothed leaflets ½-1 in. long. The roundish flower heads are dark purple, borne on long stalks in summer.

Culture &c. as above.

A. microphylla (*A. Novæ Zealandiæ*). A small creeping evergreen herb, 1-2 in. high. Leaves 1-2 in. long, with 2-6 pairs of ovate toothed leaflets. Flowers in summer, inconspicuous, in close heads, with long crimson spines, which look very attractive. Native of New Zealand.

Culture &c. as above. In severe winters this is apt to get injured in exposed situations, but as a rule it soon recovers with the advent of mild weather. It is an excellent plant for covering the face of rockwork.

A. millefolia.—A distinct species with very finely cut, pale green leaves, and dullish spikes of inconspicuous flowers.

Culture &c. as above.

A. myriophylla.—A Chilian Fern-like plant 6-12 in. high, deeply cut, with slightly downy leaflets. Flowers in summer and autumn, in small, dull-coloured, rounded spikes.

Culture &c. as above.

A. pulchella.—A pretty bronzy-leaved species with inconspicuous flowers. It grows rapidly and is well suited for covering rockwork.

Culture &c. as above.

A. sarmentosa.—A vigorous perennial from Tristan d'Acunha with silky-haired leaves and round heads of flowers borne on rather long woolly stalks.

Culture &c. as above, p. 381.

A. sericea.—A Chilian species with rather long leaves having 3–5 pairs of oblong wedge-shaped toothed leaflets, covered with soft silky hairs beneath. The greenish flowers appear in round heads on long stalks, but are not particularly attractive.

Culture &c. as above, p. 381.

A. splendens.—A stout-growing tufted species native of Chili. The pinnate leaves have 3–4 pairs of narrow obovate toothed leaflets densely clothed with silky white hairs on both surfaces. The rather inconspicuous flowers appear in long interrupted spikes during summer.

Culture &c. as above, p. 381.

ROSA (The Rose).—An important genus containing according to Bentham and Hooker not more than 30 or 40 really distinct species although as many as 180 have been described as such. Roses are more or less erect, climbing, or trailing, often prickly, smooth, silky, or glandular haired, woody shrubs, with alternate, oddly pinnate leaves, serrated leaflets and adnate stipules. Flowers solitary or in corymbs. Calyx 5-lobed; lobes simple or compound, inserted on the top of a roundish or pear-shaped, fleshy tube. Petals 5, very rarely 4, but in cultivated varieties many more owing to the transformation of the numerous stamens. Carpels numerous, inserted at the base of the calyx tube, free, with a simple projecting style and stigma. The ripe fruits (known as 'hips') consist of many 1-seeded carpels in a fleshy tube, which is analogous in structure to the Apple and Pear.

Garden Roses

Garden Roses are divided into many groups, all arising from comparatively few species. Years ago several of the groups mentioned below were great favourites, but the appearance of the so-called Hybrid Perpetuals and the Tea-Scented Roses, with their exquisite flowers, rapidly caught the public taste; and the older Roses, many of them very beautiful, free-flowering, and fragrant, began to disappear from gardens and likewise catalogues. Of late years, however, a revival has taken place, and some of the older sections with 'improved' forms are finding their way into gardens again.

GENERAL CULTIVATION

Situation.—Roses should be grown in an open place, sheltered if possible, by surrounding vegetation at a distance, from tempestuous winds, especially the cold and bleak ones from the north and east. An aspect facing south-east or south-west is best, arranged in such a way that during the hottest hours of the day the Rose garden may obtain a little protection from the fierce rays of the sun by the cast shadow of trees or hedges.

Soil.—The ideal soil for Roses is a rich fibrous loam, 'unctuous loam' as it is called, that feels somewhat greasy when pressed between the fingers. It is not always possible to attain the ideal, nor is it really essential, as good Roses may be grown in ordinary garden soil, always provided the Rose-grower is industrious and cultivates it. Where soil is naturally light the addition of loam or even clay will improve its texture. Where cold and heavy, it must be well drained, and will be benefited by the addition of lime, sand, burnt earth, and leaf soil. But whatever kind the soil may be, it is essential that it must be thoroughly drained, dug or trenched well, and well manured. Too much importance cannot be attached to keeping the soil in which Roses are grown in a good condition, and the reader is referred to the various articles on Soil and its treatment in this work at pp. 61–69.

Manure.—Taken all round, farmyard manure is the best for Roses. For light soils cow manure is preferable to others, while horse manure is more suitable for heavy soils. And the ordinary Rose-grower will find it safer to keep the one or the other well incorporated with his soil. Pig manure is also excellent. The manures in a fairly well-rotted state may be spread over the Rose beds about November, and forked in the following spring.

There are many other manures employed, but they are either too expensive or too difficult to obtain at the right moment. Some of the chemical manures may be used with advantage, but they require to be carefully applied, the tendency with a beginner always being to give more to the plants than is good for them.

When trenching or digging Rose beds, about ½ to 1 lb. of basic slag to the square yard may be added to the soil and well mixed with it. In ground that has been well dunged, a sprinkling of lime on the surface about November will be beneficial not only in liberating potash foods, but also in keeping the soil from souring and by acting as a check on slugs and other vermin. The addition of soot to the lime is an excellent practice.

Liquid manure and watering.—Perhaps the best and safest consists of horse or cow manure and soot made up in a tub or tank. Clean water diluted with this to the colour of pale ale may be given to the plants occasionally, say two or three times a week. Care must be taken, however, not to apply strong liquid manure in hot dry weather, unless the plants have previously had an application of clear water. The reason for this is that the thirsty roots would absorb the manurial matters too greedily and thus do the plants more harm than good. By first of all giving clear water, the roots absorb enough to fill the tissues of the plants, and when the liquid manure is given it is taken up in only small and beneficial quantities.

During the flowering period, one ounce of nitrate of potash and one ounce of phosphate of potash to one gallon of water makes a good stimulant for outdoor plants, but for plants in pots the same quantity of manure should have at least twice as much water. If the reader uses these manures, it will be wise to experiment with smaller doses than above prescribed, in case of causing injury; and when watering always soak the soil thoroughly, as merely wetting the surface is worse than useless.

Mulching and Hoeing.—In dry seasons, and especially in light soils, it is necessary to keep as much moisture in the soil as possible. A good mulching of cow manure, or even rotted leaves, not only retards excessive evaporation of moisture from the soil, but also prevents it being cracked and baked hard by the sun. Next to a good mulching with manure, the surface of the soil to the depth of an inch or two should be well hoed, the fine soil thus acting as a mulch, and checking evaporation.

Planting.—November is the best time for planting Roses. The ground should have been well dug and manured previously, and should be in a good friable condition—neither wet and sticky, nor dry and dusty. A mild day should be chosen. The plants should be placed in the soil just deep enough to give the roots a firm hold, taking care to spread these out well, so that the soil gets in easily between the fibres. The soil should be trodden down firmly, but no manure should be put in direct contact with the roots. A layer, however, may be placed round the stem after planting to act as a mulch and a protection from frost at the same time. Dwarf or bush Roses should be about 12–15 in. apart, with 2 feet between the rows, and require no stakes; but standards or half-standards should have a stout stake attached at the time of planting to prevent injury from strong winds.

The diagram at p. 1082 will give an idea of the way in which not only Roses but other trees and bushes should be planted. The future success of a plant often depends upon whether it has been planted properly or not.

Before actually planting it is wise to carefully examine each plant, cutting away any injured roots. The branches also, if long and vigorous, may each be cut back to 3 or 4 'eyes' or buds, leaving the one next the cut pointing outwards. Some disagree with pruning at planting time, but there are sound physiological reasons for it, in addition to the fact that some of the most successful growers practise it.

As soon as possible after arrival the plants should be put in the soil. If they appear dried up or withered, a good watering all over will do them good; or they may be buried completely in the soil for a few days, when they will recover their plumpness. In the event of frosty weather, it is better to dig a trench, into which the plants may be put and have their roots covered with soil until planting time.

Roses on their own Roots.—Of late years there has been a demand for Roses on their own roots, instead of those which are usually budded or grafted. They may be a little more difficult to establish than others, but when once in a suitable position they grow well and have the great advantage of not being weakened by the strong suckers of ruder sorts. When purchased from the ground they may be planted in November, as recommended for the others; but if in pots, as they usually are, the best time to plant them is from August to October. Each plant on removal from the pot to the open ground should have fine light or very sandy loam with a little decayed manure placed round it, to induce new roots to form more quickly.

No large garden should be without Hybrid Perpetual and Tea Roses on their own roots, as the shoots thrown up from the roots give a succession of bloom.

Own-root Roses may be obtained by means of cuttings or layers described below; but, to obtain a large stock in a short period, resort must be had to budding at first, so as to obtain as many plants as possible, from which cuttings may afterwards be taken.

Pruning Roses.—The pruning of Roses depends a good deal upon their natural features. The main object of pruning is, of course, to strengthen the plants, preserve or mould their shape, and impart more substance, size, and brilliancy of colour to the flowers. A couple of sharp knives, and a pair of pruning scissors for smaller shoots or ones difficult to cut with a knife, are the tools required, and a pair of gloves is not to be despised.

In pruning Roses the chief things to remember are: 1. That the strong growers should not be so severely pruned as the weaker ones. If strong growers are cut back close, they will send forth other strong shoots, full of leaf but lacking in flower. The branches of these, therefore, should be only slightly cut back to 5 or 6 eyes, but some of the others that crowd the centre or have taken awkward turns are to be cut away altogether, thus giving more strength to those left behind. 2. Weaker plants, being less able to support a large number of shoots than the strong-growing varieties, are to have every branch cut back to within 2 to 4 buds of the base—always taking care that the bud nearest the cut is pointing outwards, as the direction of the bud of course indicates the direction in which the new shoot will naturally develop. Varieties which flower freely require more severe pruning than those which flower poorly. Climbing Roses require practically no pruning, although now and again it will be advisable to take out a branch here and there. Tea Roses in the open air require only a little thinning out and shortening of the shoots. In the event of too many shoots appearing after pruning the least desirable may be pinched or rubbed out with the finger and thumb. This is called 'disbudding,' and where exceptionally fine flowers are wanted, the practice may also be applied to the flower-buds—pinching off all except the one required on each branch. March and April are the best times for pruning, as a rule, but the season must always be taken into account, and the operation performed at the most suitable time about this period of the year.

Pegging down Roses.—Where a mass of bloom is required instead of a few large handsome blooms, the ripened shoots may be bent down to the soil, and pegged down here and there. This is as a rule best done in March, when the weather is mild and the danger of particularly severe weather is over. Strong stout stakes about 1½–2 ft. long may be driven into the soil around the Rose bush, leaving about 9–12 inches exposed. To this the shoots may be tied after bending down to the soil. Fresh shoots will spring up during the season, and the following year will bloom. The shoots that flowered the previous year may be cut away at pruning time or as soon as they have finished blooming, unless there is a chance of securing a second crop of blossoms in autumn.

Where pegging down Roses is practised a good deal of space is required for the plants. Three or four feet apart is not too much by the time the shoots are covered with flowers.

Labels.—Where a large number of varieties are grown it is well to have the plants labelled. An ordinary wooden label, not too large, painted white, and written upon while still damp, will be found as suitable as any. It may be attached with a piece of thin copper wire.

By having the plants correctly labelled nothing is left to treacherous memory or to chance in recording the behaviour of any particular variety. Some sorts flourish in one garden and fail in another under equally good circumstances, and it would be unfortunate if the failure or success of an incorrectly named Rose were credited to the real variety, which would probably behave quite differently under the same treatment.

PROPAGATION

Roses are increased by seeds, cuttings, layers, suckers, budding, and grafting. Seeds are only sown for the production of new varieties or hybrids. They are best sown as soon as ripe, and when sown in the open must be protected from mice and birds. They are usually several months in germinating, but when the seedlings are large enough to handle easily they may be transplanted to quarters where they can be protected in winter.

Cuttings of all the strong-growing Roses root readily. In autumn ripened shoots about 9 or 12 in. long may be firmly inserted about 6 in. deep, much in the same way as Gooseberries and Currants, but all the buds should be left on. By spring they will nearly all be rooted and begin to grow. They are best left until the autumn and then moved to their permanent position.

Tea Roses and other more tender sorts may be rooted in the same way, but they require the protection of a cold frame during the winter months.

Layering is not much practised. The principle is as explained at p. 59. The plants obtained in this way are on the same level as those from cuttings by being on their own roots, and always safe from the suckers of an inferior variety. It is not essential to detach the rooted layers. They may be allowed to remain round the parent plant if space will permit, and when in bloom will present a magnificent sight.

Budding is the most popular means of increasing Roses, and almost every amateur who is fond of them likes to do his own budding. The stocks chiefly used are the Dog Rose—taken from the hedges, struck from cuttings, or raised from seed—the Manetti, and sometimes De la Grifferæ—a form of *R. polyantha.* Each kind has its champions, but there is a preponderance in favour of the Dog Rose or Briar.

In the south of France stocks of *Rosa polyantha* have been largely used and spoken of very favourably. Unfortunately, the seeds are somewhat difficult to procure, and this will prevent its becoming common. The seeds germinate in about a month's time, and Roses have been budded on July 2 on plants the seeds of which were sown on March 14. Plants on the *polyantha* stock are said to produce twice as many flowers as those on the *canina* (Dog Rose) stock.

Rose budding is generally practised in June and July, and the process is detailed at p. 58.

Grafting Roses is generally done in March out of doors, and is practised on old standard trees which have lost their tops; but it is scarcely worth the trouble.

Grafting may also be performed during the winter months in greenhouses. The stocks should be a little in advance of the grafts, by placing them in gentle heat some time before the operation is to be performed. Care must also be taken to secure sound wood in the grafts, and no shoots that have been injured by frost are of any use. By whip-grafting (see p. 52) a good union may be secured, afterwards tying both stock and graft up carefully and firmly, and placing in a warm close frame. Light is best excluded for several days until the union has almost taken place, but as soon as possible it should be admitted. Budding may be practised at the same season and under similar circumstances, and it is possible to have Roses in bloom by the following June, or about six months after the process.

Besides the above methods Roses may also be successfully increased by means of the single 'eyes' or buds. These are cut in the same way as for budding, but a portion of the leaf—say the 2 bottom leaflets—is retained and the wood is not detached from the bark, but is left to form a plate from which the roots are to be developed. The 'eyes' thus prepared are dibbled into sandy soil and placed in gentle bottom heat, soon root, and produce young plants. If kept growing without a check this is a good way of increasing Roses. The dormant buds attached to a piece of the old wood will also root in bottom heat if inserted about pruning time.

DISEASES AND PESTS

Mildew (*Sphærotheca pannosa*). — If outdoor Roses are kept in a good state of cultivation—that is, if the soil is kept well tilled, the drainage perfect, and water abundant but not irregularly supplied—they do not suffer much with mildew. If they do, as often as not something is wrong in one or other of the departments mentioned, or perhaps an erratic season with sudden changes from hot to cold, drought or wet, is to blame. Any way, good cultivation is a great preventive. Soot sprinkled over the foliage when the dew is on it, and allowed to remain a few days before washing off, is an excellent if unsightly remedy. Water, as hot as the hand can bear, with permanganate of potash dissolved in it I have found effectual if applied forcibly in a fine spray with a syringe.

Rose Rust (*Phragmidium mucronatum*), which disfigures the leaves of Hybrid Perpetuals with orange-yellow spots, and any other fungoid disease may be checked if not destroyed by the same means, or sprayed with liver of sulphur at the rate of about 1 oz. to 10 gallons of water.

Green Fly.—These are very fond of sucking the sap out of the young and tender shoots. A simple remedy is to syringe the plants with warm water in which a little soft soap has been added, and perhaps a little petroleum—about a teaspoonful to a gallon, thoroughly mixing the whole with the syringe.

The caterpillars of various moths also play havoc with Rose leaves, and the only sure remedy for these is to pick them off and kill them. It is a nasty process, but it must be done if the bushes are to retain anything like a decent appearance, and produce good flowers.

In the following pages brief descriptions are given of the best kinds of Roses for garden purposes. The varieties have been classified in sections usually adopted by rosarians, and in the more important classes, like the Hybrid Perpetual and Tea-Scented, they have been further subdivided according to the prevailing colour. No attempt has been made to make a short and select list of varieties. Such lists are often misleading, as they are for the most part based on the experience of a few individuals who usually record only the varieties that succeed or fail in their own particular garden.

HYBRID PERPETUAL ROSES.

It is a stretch of the imagination to call these Roses 'Perpetual' in the sense of lasting a long time in bloom, as comparatively few of them bear flowers after August. Indeed many of the beautiful Tea Roses remain much longer in bloom than the Hybrid Perpetuals. The latter are supposed to be the outcome of hybridising and selecting the best forms of *R. gallica* and *R. damascena*, the first step in the process being a hybrid named *R. Portlandica* after a Duchess of Portland who was a great lover of Roses in the eighteenth century. In the course of time, however, they seem to have become so much mixed up with other sections that it is practically impossible to trace their origin.

The following is a list of the best Hybrid Perpetuals, but it must be borne in mind that new ones are being added every year by British and Continental Rose-growers. Those who seek novelties should therefore consult nurserymen's catalogues every season.

The varieties are arranged according to the predominant colour of the flowers, as it is often convenient to make a selection of a particular tint. For general culture and propagation see p. 382.

Shades of RED, CRIMSON, CARMINE &c.

Abel Carriere, rich velvety maroon, large and well formed.

Alfred Colomb (*Marshal P. Wilder*), bright carmine-red, large, full, and globular.

A. K. Williams, bright reddish-crimson, large, and of beautiful form.

Anna de Diesbach, brilliant carmine, beautifully formed, large and cupped.

Ards Rover, splendid crimson.

Auguste Neuman, velvety crimson, full, and good habit.

Bacchus, crimson, shaded violet-maroon, free.

Baronne de Bonstetten, intensely dark velvety crimson, medium size.

Beauty of Waltham, bright rosy crimson, large, cupped, and finely formed; very fragrant.

Black Prince, very dark crimson, richly shaded.

Camille Bernardin, bright red, large and full, fine form.

Captain Hayward, bright carmine-crimson, a new shade of colour; fine and full.

Charles Darwin, deep rich crimson, large and full.

Charles Gater, the finest new crimson Rose of late years, large globular flowers of brownish-red.

Charles Lefebvre (*Marguerite Brassac*, *Paul Jamain*), brilliant velvety crimson, cupped, and well formed.

Climbing Duchess of Norfolk, bright crimson, fine shape, fragrant.

Climbing Etienne Levet, fine carmine-red, globular, good habit.

Climbing Jules Margottin, bright scarlet, perfect shape, very fragrant.

Climbing Star of Waltham, deep crimson, good form, imbricated.

Climbing Victor Verdier, bright cherry-red, large and well formed.

Colonel Felix Breton, very rich violet-crimson, imbricated, good form.

Coquette des Blanches, white, tinged with pink.

Countess of Oxford, bright carmine-red, very large and full.

Crimson Queen, dark crimson, very fragrant.

Dr. Andry, brilliant red, shaded crimson, very effective.

Duchess of Bedford, rich velvety crimson, suffused with scarlet, perfect shape.

Duchess of Norfolk, bright crimson, fine shape, fragrant.

Duke of Albany, vivid crimson and good form.

Duke of Connaught, rich, bright velvety crimson, an exquisite colour.

Duke of Edinburgh, deep velvety crimson, good form and habit.

Duke of Teck, bright crimson-scarlet, large and full.

Duke of Wellington, dark crimson, large and full.

Dupuy Jamain, bright cerise, large free bloomer.

Earl of Dufferin, a rich dark crimson, shaded maroon, large and full.

Earl of Pembroke, bright brownish-crimson, margin bright red.

Eclair, very bright scarlet, globular, free and good.

Ella Gordon, bright cherry-crimson, large and full, good in autumn.

Empereur de Maroc, rich velvety maroon; a good dark variety.

Etienne Levet, fine carmine-red, globular, good habit.

E. Y. Teas, bright cerise, cupped, large and fine shaped.

Fisher Holmes, rich purplish-crimson, medium size, flowers beautifully imbricated.

François Levet, cherry-rose, fine shape.

General Jacqueminot, most brilliant crimson, large; a grand Rose. This variety has been crossed with *R. multiflora*, and has produced a charming hybrid called the 'Dawson Rose,' see p. 403.

Gloire de Margottin, brilliant red, an excellent climber.

Glory of Cheshunt, rich shaded crimson, cup shape, and free bloomer.

Grand Mogul, deep crimson, shaded with scarlet and black, good form. Also known as *Jean Soupert*.

Gustave Piganeau, brilliant carmine-lake, one of the very largest Roses, of excellent habit.

Haileybury, cerise-crimson, round.

Harrison Weir, rich velvety crimson, large recurved petals.

Helen Keller, brilliant rosy cerise, large, full and good autumnal flowers.

Henry Bennett, fine bright red, shaded with carmine, good form.

Horace Vernet, velvety reddish-purple, shaded dark crimson.

James Brownlow, brilliant carmine.

J. D. Pawle, velvety crimson, cupped flower, and good for forcing.

Jean Cherpin, very dark plum colour, free and hardy.

Jean Liabaud, dark velvety crimson, large and full.

John Bright, pure glowing crimson, cup shape.

John Hopper, brilliant rosy crimson, lilac tint on back of petals, large, full and a free bloomer.

Jules Margottin, bright scarlet, large and very fragrant.

Lady Helen Stewart, bright and clear crimson-scarlet, fine upright form.

Lord Bacon, deep crimson, fine form, and abundant bloomer.

Lord Clyde, rich scarlet-crimson, large.

Louis van Houtte, velvety crimson, shaded with purple, globular shape.

Madame Charles Crapelet, bright cerise, full, fine shape.

Madame Thérèse Levet, bright cherry-rose, large and full.

Madame Victor Verdier, bright cherry-red, large and fine shape.

Mademoiselle Annie Wood, rich crimson, fine double.

Marie Baumann, bright carmine, the reverse of petals white, fine form.

Marie Rady (*Comtesse de Choiseul*), brilliant red, edged with white, nicely imbricated.

Marquis of Salisbury, rich crimson, perfect globular form.

Maurice Bernardin (*Ferdinand de Lesseps*, *Sir G. Wolseley*, *Exposition de Brie*), rich vermilion, very full, large globular shape.

Merry England, rosy crimson, striped with white.

Mrs. Harry Turner, dazzling crimson-scarlet, large, and beautifully imbricated.

Mrs. Jowitt, brilliant crimson, large and deep globular form. Also known as *Duc de Rohan.*

Paul's Carmine Pillar, bright rosy carmine, a good climber.

Paul's Cheshunt Scarlet, beautiful in bud, semi-double, vivid scarlet-crimson.

Pierre Notting, dark red with a violet tint, very fine.

Préfet Limbourg, dark velvety red, large and cupped.

Prince Arthur, very rich dark crimson, in the form of *General Jacqueminot.*

Prince Camille de Rohan (*La Rosière*), dark velvety crimson-maroon, richly shaded, large and full.

R. B. Cater, bright magenta-carmine, beautifully shaped, early and free flowering.

Red Gauntlet, bright scarlet-crimson, good shape.

Reynolds Hole, rich crimson, shaded maroon, fine globular form.

Robert Duncan, bright rosy lake, perfectly formed, free blooming and continuous.

Rosieriste Jacobs, rich velvety red, clouded with black, good form.

Royal Scarlet, a single scarlet variety, blooms produced in great abundance, useful for bedding.

Salamander, bright crimson-scarlet, very vivid, large and full.

Sénateur Vaisse, dazzling scarlet, fine form and large, a free bloomer.

Sir Rowland Hill, a rich deep port wine colour, large, full and sweetly perfumed.

Souvenir de Henry Vy, dark crimson and good form.

Star of Waltham, deep crimson, large, full and deeply imbricated

Sultan of Zanzibar, blackish-maroon, edged with scarlet, large globular flowers.

Suzanne Marie Rodocanachi, soft rosy cerise, very distinct and beautiful.

The Shah, very bright red, shaded, of medium size.

T. W. Girdlestone, brilliant vermilion, thoroughly distinct, large, full and well formed.

Tom Wood, cherry-red, large, full and perfectly formed, flowers very freely.

Ulrich Brunner, cherry-crimson, very large blooms, effective.

Victor Hugo, brilliant crimson, free-flowering.

Victor Verdier, cherry-rose, shaded with carmine, large, fine and very free.

Waltham Standard, brilliant carmine, shape and petal of *A. K. Williams*, fine foliage and a grand exhibition Rose.

Xavier Olibo, velvety black, shaded with amaranth, large globular form.

Shades of PINK *or* ROSE

Abel Grand, beautiful silvery rose, glossy and fresh in colour, large and full.

Alphonse Soupert, bright pink, very large and free.

American Beauty, deep rose, large, globular, and good shape; deliciously scented.

Anna Alexieff, bright rose, large, very free bloomer.

Baroness Rothschild, very light rosy pink, changing almost to white; fine shape, and free.

Clara Cochet, bright pink, clear in colour, globular shape.

Climbing Edouard Morren, glossy pink, delicate in colour.

Climbing La France, satiny pink, a good climber.

Climbing Marie Cointet, bright rose, changing to blush.

Climbing Queen of Queens, pink, with blush edges, free bloomer.

Clio, flesh colour, shaded rosy pink, large and globular.

Comtesse de Serenyi, delicate pink, shaded rose, large compact flower of splendid shape.

Countess of Rosebery, soft carmine-rose, large and full, cupped form, hand some foliage.

Dowager Duchess of Marlborough pure rose, large globular flower, beautifully scented.

Duchesse de Morny, clear bright rose and fine shape.

Duchess of Fife, soft silvery pink, a beautiful shade, finely cupped.

Duchesse de Vallombrosa, light rose-peach passing to white, large globular flower.

Duchess of York, pale pink flushed with rose.

Edouard Morren, brilliant glossy pink, fresh and clear, very large.

Egeria, beautiful light silvery peach, good shape.

Elie Morel, lilac-rose, large and full, perfect form.

Ellen Drew, silvery pink, quite a distinct Rose. A sport from *Duchesse de Morny.*

François Michelon, deep rose, reverse of petals silvery.

Heinrich Schultheis, delicate pinkish-rose, large and fine form.

Her Majesty, flesh colour, large massive flowers, reflexed.

Jeannie Dickson, rosy pink, edged silvery white, good form.

La France. Perhaps no Rose is better known or more highly valued for general planting, both in open ground or under glass, than *La France*. It is a Hybrid Tea, but usually classed with the Hybrid Perpetuals; very beautiful in form and colour, which is a lovely shade of peach blossom, changing to amber-rose, elegantly tinged with crimson.

Laurence Allen, soft pink, lighter shading, large and full.

Madame Gabriel Luizet, light silvery pink, edges of petals shading off to white, large and good.

Madame Laurent, bright rosy colour and globular form.

Madame E. Michel, fine bright rose very large and full, like *Madame Gabriel Luizet*, but deeper in colour.

Madame Vidot, transparent flesh, shaded with rose, large and full.

Mademoiselle Eugénie Verdier (*Marie Finger Amadis*), bright flesh colour, large, full, good habit.

Magna Charta, bright pink, globular, very large and fine habit.

Marchioness of Downshire, beautiful satin pink, shaded with rose, large and full.

Marchioness of Dufferin, beautiful rosy pink, very large, full and fine form.

Marchioness of Lorne, a very rich and fulgent rose colour, slightly shaded in centre with vivid carmine.

Marguerite de St. Amand, bright pink, large, full and imbricated.

Marie Cointet, bright rose, changing to blush, pretty reflexed form, very free.

Marie Verdier, bright satiny pink, beautifully cupped.

Marquise de Castellane, bright rose, large and fine.

Mrs. George Dickson, delicate soft pink, beautiful in bud.

Mrs. John Laing, soft pink, a large and beautiful Rose of globular shape.

Mrs. R. G. Sharman Crawford, deep rosy pink, outer petals shaded with pale flesh, free bloomer.

Mrs. W. Rumsey, fine rich pink, good for cutting.

Monsieur Noman, pure rose, large and magnificent.

Paul Neron, deep rose, large and good shape.

Pride of Waltham, delicate flesh, shaded with bright rose.

Princess Louise Victoria, flesh changing to blush; makes a good pillar Rose.

Queen of Queens, pink, with blush edges, good form, and very free bloomer.

Spenser, satin pink, very large and full.

Shades of WHITE *or* BLUSH-WHITE

Baronne de Maynard, pure white, moderate size, good form.

Bladud, silvery white, full and globular.

Boule de Neige, pure white, good form, fine in bunches.

Elise Boelle, white, centre peach, free bloomer.

Helen Paul, pure white, sometimes shaded pink.

Impératrice Eugénie, a fine white.

Madame Alfred de Rougemont, white, tinted with pink, moderate size, free bloomer.

Madame Fanny de Forrest, beautiful white, free bloomer.

Madame Freeman, white, shaded rose.

Madame Lacharme, pure white, large and full, blooms freely.

Mademoiselle Bonnaire, white shaded blush, medium size, fine form, requires close pruning.

Marchioness of Londonderry, ivory white, shell-shaped and reflexed.

Marquise de Montemart, blush-white, splendidly double.

Mavourneen, delicate silvery white, shaded rose-flesh.

Merveille de Lyon, white, slightly tinted with rosy peach, splendid size and shape.

Miss Ingram, white with a blush centre.

Perle des Blanches, pure white, medium size, good shape.

Violette Bouyer, white, shaded delicate flesh colour, large globular flowers.

White Baroness, pure white, large full flower, very fine.

TEA-SCENTED ROSES.—The Tea Rose—perhaps the most exquisite of all beautiful Roses—is supposed to be descended chiefly from *R. indica* and its variety *odorata*, remarkable for the fragrance of its blossoms. Like the Hybrid

Perpetuals, they have been selected and crossed and brought to great perfection both in this country and on the Continent.

Unfortunately they are not quite so hardy as the Hybrid Perpetuals, and most of them require a slight protection of litter or bracken or farmyard manure around them during severe winters, especially in northern parts of the kingdom, and in other bleak localities.

Although the kinds enumerated below are roughly grouped according to their colours, it is simply impossible to do justice in print to the many beautifully tender and delicate shades of colour in the Tea Roses as a class. As they are a good deal mixed up with the Noisette Roses, the reader would do well to consult both lists when looking for any particular variety, as it may be in one or the other according to the views of certain rosarians.

For general culture and propagation see p. 382.

The following is a list of the best kinds:—

Shades of PINK, ROSE, *and* CRIMSON

Adam (*President*), blush-rose, very sweetly scented, large and full.

Aline Sisley, violet, shaded red, medium size.

Alphonse Karr, bright peachy crimson, semi-double and free.

Anna Olivier, rosy flesh, base dark, fine form and very distinct.

Beauté Inconstante, coppery red, shaded with carmine and yellow.

Bridesmaid, a strong, vigorous form of *C. Mermet*, of deep pink colour.

Catherine Mermet, fine flesh colour, full and perfect form; one of the finest. Best grown in bold groups, as individual plants have a somewhat naked appearance.

Clara Watson, salmon tinted pink, a good Rose.

Cleopatra, pale pink, edged with rose, pretty in bud.

Clotilde, rose and white, centre sometimes violet, double.

Comtesse de Nadaillac, bright, flesh-coloured rose, with coppery yellow or apricot base, very fine in the bud and open flower.

Comtesse de Panisse, bright flesh colour tinted coppery rose, very full, and good form.

Comtesse Riza du Parc, beautiful metallic rose, changing to pink, large globular form, a pretty colour.

Corinna, flesh colour, shaded with rose and suffused with tawny copper.

Dr. Rouges, deep red with orange shading, long semi-double bud, distinct.

Duc de Caylus, deep rosy magenta, flushed with creamy white and canary-yellow.

Duchess of Edinburgh, deep rosy crimson, large and full, good for forcing.

Elise Fugier, very pale lemon-white.

Emanuel Geibel, a sport from *Madame Falcot*, but much deeper in colour.

Empress Alexandra of Russia, rich lake shaded with orange, large and globular, distinct.

Ernest Metz, delicate carmine-rose, reverse of petals deeper, well formed.

Ethel Brownlow, bright salmon-pink, shaded with yellow at base of petals.

François Dubreuil, beautiful crimson.

General Billot, pale violet flushed with amaranth.

Goubalt, bright rose, centre buff, large and full.

Gustave Chandos, salmon-red, very free, hardy and vigorous growth.

Homer, rose with deeper centre, a pretty crimpled flower.

La Nuance, delicate flesh colour, fine form, very pretty.

Madame Berard, light, rich salmon, large reflexed flowers, very fine.

Madame Camille, delicate salmon-pink, large and full.

Madame Charles, bright apricot, beautiful in bud.

Madame Cusin, rose-purple with yellow centre, fine form.

Madame de St. Joseph, salmon-pink, large and double.

Madame de Watteville, pale lemon, with margin of pink, passing to deep rose, very distinct and free.

Madame Falcot, dark apricot, large and very fine.

Madame Lambard, fine bright red, sometimes paler later in the season, fine imbricated form. One of the best Tea Roses.

Madame Marie Ducher, transparent rose, very large, fine form and good habit.

Maman Cochet, large and full, pink shaded with salmon-yellow, a good novelty.

Marquise de Vivens, a distinct and beautiful bright pink rose, with semi-double flowers, deliciously fragrant.

Mrs. Pierpont Morgan, like *Madame Cusin*, with deeper shade of colour.

Mrs. Wilson, colour deep lemon-yellow, petals tipped with rose.

Papa Gontier, bright rosy crimson, exceedingly pretty in bud.

Princesse Alice Monaco, outer petals pink, centre salmon-yellow.

Safrano, bright apricot, changing to buff, beautiful in bud.

Souvenir de Président Carnot, very free, bud long, rosy flesh colour, large and full, perfect form.

Souvenir d'un Ami, salmon-rose, large, and fine shape. This is a vigorous and free-flowering Rose, and although the blossoms hang their heads somewhat, they are very fine.

Waban, carmine-pink, splashed with flaming madder-red.

Shades of YELLOW

Albertine Bouquet, pale lemon yellow.

Amasone, golden yellow, long pointed buds.

Belle Lyonnaise, deep canary yellow, changing to salmon, large, globular, and full.

Climbing Perle des Jardins, fine orange yellow, good climber.

Comtesse Dusy, pale lemon yellow.

Duchess Marie of Ratibor, creamy yellow with a reddish centre; strong grower.

Etoile de Lyon, fine sulphur yellow, with brighter centre, large and perfectly formed.

Francisca Kruger, coppery yellow, shaded with peach, large and full.

Gloire de Dijon, buff, shaded with salmon, orange centre, very large and good form. A splendid Rose for all purposes.

Gloire Lyonnaise, clear chrome yellow, changing to silvery white, large, full, and good shape.

Golden Gate, very pale lemon yellow, edged faintly with pink; not a very strong-growing variety.

Gustave Regis, canary yellow with orange centre, beautiful in bud.

Henriette de Beauvan, bright clear yellow, free; a good climbing Rose.

Innocente Pirola, light fawn, changing to white, beautiful shape.

Isabella Sprunt, sulphur yellow, beautiful in the bud, free bloomer.

Jean Ducher, salmon yellow, shaded rosy pink, large, full, and globular.

Jeanne Forgeot, golden yellow, shaded nankeen and rose.

La Boule d'or, golden yellow, but requires hot seasons to come to perfection

Le Soleil, beautiful chrome yellow; blooms freely in autumn.

Louise de Savoie, lemon yellow, very large and double.

Ma Capucine, bronze yellow, beautiful in bud, a charming button-hole Rose.

Madame Caroline Kuster, beautiful orange yellow, large, globular and free-flowering. Often classed as a Noisette.

Madame Chedane Guinoisseau, very bright yellow, exquisite colour and shape.

Madame Eugène Verdier, very deep yellow, distinct and attractive.

Madame Germaine Trochon, yellow, shaded nankeen yellow, large and full.

Madame Margottin, beautiful citron yellow, centre rosy peach, large and well-formed.

Narcisse, fine pale yellow, free and full.

Perfection de Monplaisir, deep canary yellow, lovely, medium size.

Perle des Jardins, fine orange yellow, very large and fine form; one of the very best.

Perle de Lyon, deep yellow, sometimes tinted apricot, large, very full and fine form.

Princess Beatrice, rich golden yellow, paler towards outside of flower, large and well formed.

Princess of Wales, rosy yellow, deeper centre, large and perfect form.

Raoul Chauvry, yellow, shaded apricot; flowers large, buds very long.

Sappho, fawn colour, shaded with yellow and tawny buff, globular, large and full, very distinct.

Souv. de Jeanne Cabaud, copper-coloured, shaded yellow and carmine.

Sulphureaux, fine sulphur-rose, large and full.

Sunset, deep orange yellow, perfect form; a very fine Rose.

Shades of WHITE, *or* WHITE TINTED WITH ROSE, PINK, SALMON, &c.

Annacharton, cream, edged with carmine and rose; very free.

Climbing Devoniensis, white, with yellow tint, fine, of rampant growth.

Climbing Niphetos, beautiful pure white, a vigorous grower, flowers on the lateral shoots.

Devoniensis, white, with yellow tint, large and fine.

Enchantress, white, slightly tinged with yellow in the centre, globular; strong and free.

Etendard de Jeanne d'Arc, creamy white, changing to pure white, good shape; a white *Gloire de Dijon*.

Hon. Edith Gifford, white, slightly tinted, with yellow base, a grand Rose.

Letty Coles, white, with pink centre, novel and distinct.

Madame Angele Jacquier, yellowish-white, with rose centre, large and full.

Madame Bravy (*Alba rosea; Madame de Sertot; Josephine Malton*), cream, centre blush, large, and beautifully formed.

Madame Hippolyte Jamain, white, with copper-coloured centre, distinct.

Madame Hoste, yellowish-white, centre deeper yellow, large, perfect form.

Madame Maurin, white, shaded salmon, large and full.

Madame Willermoz, white, with salmon centre, fine.

Marie Guillot, fine white, tinted with yellow, large, full and fine form.

Marie Van Houtte, yellowish-white, edged with bright rose, large, full and beautiful. A splendid Rose for massing in beds.

May Rivers, white, slightly tinted with lemon, darker in centre.

Muriel Grahame, pale cream flushed with rose, a sport from *Catherine Mermet*.

Niphetos, beautiful white, large and full; one of the best.

Rubens, white, shaded with rose, good form. An excellent garden Rose.

Souvenir d'Elise, creamy white, with blush centre, very beautiful.

Souvenir d'Elise Vardon, white, with salmon centre, sometimes edged with rose.

Souvenir de Paul Neron, white, tinged with rose, full and perfect form.

Souvenir de S. A. Prince, a pure white sport from *Souvenir d'un Ami*, one of the best white Tea-Scented Roses.

Sylph, flowers ivory white tinted peach colour, magnificent exhibition Rose.

The Bride, fine white, large and full; one of the best.

White Maman Cochet, a white sport of *Maman Cochet*, a grand new variety.

HYBRID TEA-SCENTED ROSES

These have been obtained by crossing the Tea Roses and the Hybrid Perpetuals. They are hardier than the ordinary Tea Rose, and may be grown like the H.P.s. For general culture and propagation, see p. 382.

Shades of CRIMSON, ROSE, *or* PINK

Bardou Job, bright glowing crimson, almost single, a free bloomer.

Camoens, bright China rose, most taking colour, fine and large.

Captain Christy, delicate flesh colour, large and full.

Caroline Testout, light salmon-pink, very large and globular.

Cheshunt Hybrid, cherry-red, large and full, beautiful in bud, good habit, one of the finest climbers.

Climbing Captain Christy, delicate flesh colour, large and full.

Countess of Caledon, rich carmine-rose, great substance; strong growth and free branching habit.

Danmark, rosy pink, similar to *La France*, but brighter in colour, round ball-shaped flower, large and double.

Lady Mary Fitzwilliam, light rosy pink, with deeper centre, a splendid Rose.

La Fraîcheur, carmine-rose, shaded lighter, fine cup-shaped flower, very long buds, a grand Rose.

Longworth Rambler, light crimson, semi-double, very vigorous. A good autumn-flowering climber. Also known as *Deschamps*, and classed with the Noisettes.

Madame Cadeau Ramey, rosy flesh shaded with yellow, a pretty combination of colours.

Madame de Tartas, bright rose, medium size, very free.

Marquis de Litta, carmine-rose, vermilion centre, large, full and cupped.

Meteor, dark red, fine and very free.

Mrs. W. C. Whitney, clear deep pink, large, full and well-formed flowers.

Mrs. W. J. Grant, bright rosy pink, large, full and beautiful.

Papillon, rosy colour, curious twisted petals, very pretty.

Princess May, a clear soft opaque pink, large, full, and globular.

Reine Marie Henriette, deep carmine, large, full, and well-formed; a good climber.

Reine Olga de Wurtemberg, a vivid red, good-shaped flowers, but only semi-double.

Viscountess Folkestone, creamy pink,

semi-climbing habit, very free-flowering, and early bloomer.

W. F. Bennett, brilliant crimson, large and free, useful for cutting.

Shades of White *or* Creamy-White

Antoine Rivoire, cream with orange-yellow centre, large and full.

Augustine Guinoisseau, a white *La France*, very lightly tinted with pale rose.

Charlotte Gillemot, ivory white, large and full, and perfect imbricated form.

Climbing Kaiserin Augusta Victoria, cream shaded lemon, a climbing sport of great vigour.

Gloire de Bordeaux, silvery white, large and full.

Grace Darling, white, shaded and edged with rose, very good and distinct.

Grand Duc Adolphe de Luxembourg, white, blooms in clusters, semi-double.

Kaiserin Augusta Victoria, white, slightly shaded lemon, deeper in centre, a distinct and beautiful rose.

Lady Alice, creamy white, large and fine form.

Madame Joseph Combit, creamy white, shaded rosy peach, flowers large and full.

Madame Jules Finger, creamy white, shaded pink with salmon centre, large and full.

Margaret Dickson, white with pale flesh centre, good form.

Marjorie, white with pink tint, free and continuous bloomer.

Miss Ethel Richardson, almost a pure white, pale flesh centre, large imbricated form, very free.

White Lady, creamy white, one of the most handsome and effective Roses grown, quite distinct.

NOISETTE ROSES (R. Noisettiana).—This group is supposed to have arisen by crossing the Tea Rose or the Bengal Rose with *R. moschata*, the Musk Rose, by a French gardener named Philippe Noisette, who sent it to France from America, and who may possibly have used the climbing native American *R. setigera* instead of *R. moschata*. The climbing character of some of the Noisette Roses rather favours this idea, but the sweet fragrance is a point in favour of *R. moschata* parentage. Some varieties are occasionally classed as Tea Roses, and it may be as well to consult both lists when looking for any particular variety. The following appear in most catalogues as Noisette Roses. For general culture and propagation, see p. 382.

Aimée Vibert, pure white, beautiful and full, flowers in large clusters. A good climbing or pillar Rose, also as a standard bush.

Alister Stella Gray, a climbing Rose, in the way of *W. A. Richardson*, with bunches of straw- and orange-yellow flowers.

Bouquet d'Or, deep salmon-yellow, with copper centre, large and full.

Céline Forestier, pale yellow, with deeper yellow in centre, free-flowering, opens well out of doors.

Cloth of Gold, deep yellow, edges sulphur, a splendid Rose when it can be flowered; requires a south wall. Rather tender. It requires no pruning beyond cutting out weak growths.

Comtesse de Galard Béarn, canary-yellow, free-flowering and a good climber.

Duchess of Mecklenburg, pale yellow, produced very freely in bunches.

Fellenberg, rosy crimson, very free bloomer.

Fortune's Yellow or *Beauty of Glazenwood*, buff striped with crimson. Rather tender, and is best grown under glass except in the mildest parts.

Jaune Desprez, light colour, fawn centre, good climber, but looks well drooping from a standard stock.

Lamarque, pure white, with sulphur-yellow centre. Rather tender, is best grown under glass except in the mildest parts.

L'Idéal, yellow and metallic red, streaked and tinted golden-yellow, quite distinct. Rather tender, and best grown under glass except in the mildest parts.

Madame Carnot, fine golden-yellow, seedling from *W. A. Richardson*, with deeper centre, edge of petals paler. It is rather tender, and is best grown under glass except in the mildest parts.

Madame Pierre Cochet, centre rich golden-yellow, shading off to yellowish-white, a profuse bloomer. Rather tender, and best grown under glass except in the mildest parts.

Maréchal Niel, bright rich yellow, large, free and fine form; the best yellow Rose in cultivation. Rather tender, and is best grown under glass except in the mildest parts. It is subject to canker, and is probably best on the Briar stock.

Princess Mecklenburg, lemon-white, cluster Rose.

Rêve d'Or, deep yellow and buff; a good climber. It is almost an evergreen and breaks into good growth from the base.

Solfaterre, sulphur - yellow, large. Rather tender, and is best grown under glass except in the mildest parts.

Triomphe de Rennes, light canary-yellow, a free bloomer.

White Maréchal Niel, a white form of *Maréchal Neil*, with a similar growth and habit, and quite as tender.

Wm. Allen Richardson, beautiful orange-yellow, flowers small, but very pretty. It seems to grow better on the Briar stock.

CHINA, BENGAL, or MONTHLY ROSES.—Supposed to be derived from *R. indica* and its varieties, and first introduced into England about 1770–1780 from Canton. Hence the name of China Rose.

The flowers are usually produced in clusters or corymbs, and in great abundance.

Culture and Propagation.—They are well adapted for planting in beds on lawns, and flower profusely almost into winter. They like warm, light soil but not dryness, and may be severely pruned except when a few shoots on a wall are required to produce early flowers. In severe winters it would be wise to give some protection with dry leaves, litter &c., as in the case of the Tea Roses. For general culture and propagation see p. 382.

The following is a selection :—

Abbé Mioland, reddish-purple ; vigorous grower.

Archduke Charles, clear rose changing to crimson.

Blairii No. 1, blush-pink, large and double, a good climber.

Climbing Cramoisie Supérieure, a bright and effective climber.

Common Blush, blush colour. This is really the best of all the Monthly Roses. It flowers profusely, and may be grown as a climber or for massing in beds, borders, banks &c.

Cramoisie Supérieure, bright crimson, very effective.

Ducher, pure white, good form and free.

Duke of York, rosy pink, edged white, good habit.

Fabvier, brilliant crimson, semi-double, very effective.

Irene Watts, varying from salmon-white to pale pink, with long pointed bud.

Laurette de Messimy, delicate rosy pink, shaded with yellow, most pleasing and effective. An excellent variety for grouping in beds.

Little Pet, or *White Pet*, produces clusters of white flowers in great profusion. Very dwarf habit.

Madame Eugénie Resal, colour variable, ranging from coppery red to bright rose. It is a seedling from *Laurette de Messimy*.

Mrs. Bosanquet, delicate pale flesh, clustering very beautiful.

Nemesis, bright crimson, free and good.

Old Crimson, deep bright crimson.

Queen Mab, soft rosy apricot, centre shaded with orange, outside tinted with red. The unopened buds are charming and very useful for sprays, coat-flowers, &c.

Red Pet, similar in habit to *White Pet*, but of a rich crimson colour changing to blackish-maroon in autumn.

Viridiflora, the green-flowered Rose.

BOURBON ROSES (R. INDICA BORBONICA).—A very useful group of Garden Roses, blooming in the autumn freely and constantly in favourable situations. They look well grown as standards, but are more effective grown in bold masses or in beds in good well-drained soil. They require very little pruning as a rule, and may be readily increased by means of cuttings. Grown on the Briar stock they come into bloom, however, somewhat later than when on their own roots. For general culture and propagation see p. 382. They are somewhat confused with other sections, but the following is a selection :—

Acidalie, blush-white of good size. This variety has slender graceful shoots, and a somewhat climbing habit.

Armosa, pink, in clusters, very free and continuous.

Baron Gonella, pinkish-lilac inside, deep rose outside. A beautiful free-flowering Rose.

Comtesse de Brabantane, flesh-coloured, fine double-flowered form ; vigorous grower.

Comtesse de Rocquigny, white flushed with pinky salmon; flowers produced in large trusses.

Gloire des Rosomanes, beautiful rich crimson, semi-double ; vigorous grower.

Kronprinzessin Victoria, soft primrose-yellow. A very beautiful sport from *Souv. de la Malmaison.*

Lorna Doone, magenta-carmine, shaded with scarlet, very handsome and sweet.

Louise Odier, bright pink, very free and hardy.

Mdme. Isaac Pereire, beautiful vivid carmine, full, and of immense size, blooms freely, growth very vigorous, one of the finest. May be grown as a bush or standard.

Mdme. Pierre Oger, white shaded and edged with pink; exquisite form.

Mrs. Paul, blush-white, with rosy peach shading, large Camellia-like flowers of great substance, growth very vigorous and good autumnal bloomer. It is a seedling from *Mdme. I. Pereire.*

Mrs. Bosanquet, pale flesh colour; very free in growth and blossom either as a bush or standard.

Purity, pure white, faintly flushed centre, growth semi-climbing.

Queen, delicate salmon or buff, fragrant. As many as 20 blossoms are often borne on one shoot when well grown.

Queen of Bedders, rich crimson, very free; dwarf habit.

Reine Victoria, bright rose, medium size; good form.

Robusta, velvety crimson shaded purple. The shoots grow 6 to 8 ft. long in one season. A good climber or pillar Rose.

Sir Joseph Paxton, bright rose, rather flat, but very free and vigorous, and excellent for town gardens.

Souv. de la Malmaison, clear blush, very large and double, superb. One of the very best.

Souv. de la Pierre Dupuy, fine deep crimson, shaded with purple, very large and double, a fine pillar Rose (Hybrid Bourbon).

BOURSALT ROSES (R. ALPINA).—The Boursalt Roses are gradually disappearing, and many rosarians consider them small loss. And yet I know an old shed, the end of which has for many years been covered with the old crimson *Amadis*, and at a distance it looks simply charming. But closer inspection reveals a very coarse flower indeed, and it is perhaps only just that it should give place to better things.

PROVENCE or CABBAGE ROSES.— These beautiful Roses are derived from *R. centifolia*, and although it is not quite clear why they are called 'Provence' Roses (as they did not originate in Provence but in the East) that name at least sounds better than the equally obscure appellation of 'Cabbage' Rose. Many years ago a double yellow Provence Rose used to be common in gardens, but now it seems to have disappeared, and is not to be found in modern catalogues.

Culture and Propagation.—The Provence Roses enjoy a rich well-manured soil, and may be severely pruned. They are best on their own roots, but also succeed well on the Briar stock. For general culture and propagation, see p. 382.

The following varieties, including the miniature Provence or Pompon Roses, are obtainable:—

Common Provence, rosy blush, large and full.

Crested or *Cristata*, rosy pink, with paler edges, beautiful.

Forcing Provence, flesh colour, large.

Red Provence, crimson, large and full.

Unique or *White Provence*, beautiful white, large and full.

York and Lancaster, white, striped with red, sometimes half red and half white.

MOSS ROSES (R. CENTIFOLIA MUSCOSA).—The Moss Roses are a charming class of hybrids derived like the Provence Roses from varieties of *R. centifolia*, and readily distinguished by the green, mossy calyx—the moss being transformed hairs of the calyx, and sometimes of the flower and leaf stalks. Of late years they have been somewhat neglected owing doubtless to the appearance of so many beautiful Tea and Hybrid Perpetual kinds, but wherever a large collection of Roses is grown the mossy section is well worth being represented. The original old red Moss Rose, from which all the other varieties have been developed, appears to have been sent to England about 1785, from Italy. It was grown by a nurseryman named Wrench at Broomhouse, Fulham, for 20 years without attracting much attention, but was afterwards taken in hand by another nurseryman named Shailer of Chelsea. He produced the first white Moss Rose in 1788, or rather it was a sport from the red variety, and he budded it on the white Provence Rose. A striped variety next appeared, and the cultivation of Moss Roses at high prices became extensive in the neighbourhood of Chelsea and Fulham.

Culture and Propagation. — Moss Roses like the best of well-drained and well-manured soil to produce their flowers in abundance. Some flower in early summer, others—known as 'Perpetual'—in autumn, thus giving a long season of bloom. They may be grown as dwarf standards or bushes and do well on their own roots, or budded on the seedling Briar. They enjoy a rich fibrous loam, with which has been incorporated plenty of well-rotted manure. About every third or fourth year they will be improved by transplanting, as they become stronger and flower more freely. They like severe pruning as a rule, but discretion must be used and notice taken of weak and strong growing varieties. They like a good mulching of manure, and may be treated generally as advised at p. 382.

The following are among the best varieties:—

SUMMER-FLOWERING VARIETIES

These bloom in May, June, and July, and are all favourites on account of their peculiar and beautiful appearance.

Alice Leroy, blush shaded with rose, large and double.

Baronne de Wassenaer, deep rose, very early, double, and showy.

Captain Ingram, dark velvety purple, fine.

Celina, flowers rich crimson, produced in panicles of 8 or 9, and with a well-mossed calyx.

Common Moss Rose, pale rose, large and free.

Comtesse de Murinais, white, large and double, each shoot with clusters of blossom.

Crested, pale rosy-pink, buds beautifully crested, distinct.

Crimson Globe, deep crimson, globular shaped flowers, and beautifully mossed.

Gloire de Mousseuses, blush, large and full, one of the best.

Gracilis or *Prolific*, deep pink, globular, large, full, and of good shape; an excellent kind.

Henry Martin, shaded velvety carmine, fine.

Lanei, deep brilliant rose, a beautiful round handsome bud fairly well mossed.

Little Gem, small double crimson flowers; charming miniature Moss Rose. This is a good variety for growing in pots. The buds are very small and very mossy, but produced in great abundance.

Luxembourg, dark purplish-crimson, beautiful.

Marie de Blois, bright rose, large, full; well mossed, handsome buds.

Nuits d'Young, velvety purple, very double.

Princess Royal, flesh, very distinct, small and pretty.

Princess Alice, deep bluish-red, centre pink, buds well mossed.

Reine Blanche, white, a good variety, pale green foliage.

White Bath, paper-white, beautiful, large and full.

'PERPETUAL' AUTUMN-FLOWERING VARIETIES

The following are all autumn as well as summer blooming kinds, and are of great merit. They should have good rich soil, and should be closely pruned.

Blanche Moreau, pure white, of perfect form, well mossed, the sepals passing beyond the bud nearly an inch, and forming a vivid contrast to the flowers.

Eugène Verdier, crimson, very large and fine.

Madame Moreau, rose, edged with white, deeper in the centre.

Madame Wm. Paul, bright rose, free-flowering.

Mousseline, white, sometimes slightly tinted in opening, large and full, and thoroughly perpetual.

Perpetual White, white, blooming in clusters, very mossy.

Salet, very bright pink, flowering freely in autumn.

Soupert et Notting, flowers very large and full, of the most perfect form, fine bright rose, foliage large, equal to the *Provence* or *Cabbage Rose*.

BANKSIAN ROSES (R. BANKSIÆ). The true Banksian Rose is a non-prickly Chinese climber, with stems often 20–30 ft. long, in favourable places. The leaves consist of 3–5 shiny, oblong, lance-shaped serrated leaflets, very hairy at the base of the middle nerve, and with ciliated stipules. Flowers in June, white, very double, nodding.

It was named by Robert Brown in honour of Lady Banks—whose husband Sir Joseph was a great patron of botany and horticulture. The first plant was introduced in 1807, and what is asserted to be the identical one is still growing at Spring Grove House, Isleworth, where the residence of Sir Joseph Banks stood until a few years ago when it was replaced by a modern mansion.

Culture and Propagation. — The Banksian Roses require the shelter of a warm wall, and a dry border with rich soil to bring them to perfection. They require very little pruning, just removing the later sappy shoots after July. The white (*alba*) and yellow (*lutea*) varieties are grown, and should be on their own roots. A mulching with manure in hard winters will prevent them being killed.

DAMASK ROSES (R. DAMASCENA). These roses are supposed to be of Syrian origin, and were first introduced from the Holy Land by a Comte de Brie when returning from the Crusades in 1270.

The shoots and leaves of the Damask Roses are of a distinct light green. The plants are perfectly hardy, with numerous fragrant flowers, and require very little pruning. For general culture and propagation see p. 882.

The varieties usually met with are *La ville de Bruxelles*, light rose, with a blush margin; *Leda* or *Painted*, blush, edged with lake; *Madame Hardy*, large, beautiful white; *Madame Staltz*, pale yellow, cupped; *Madame Zoetmans*, creamy white shaded buff; and *York and Lancaster* (true), red and white, sometimes striped, liable to sport and come self-coloured. Some of the Provence Roses are also called 'York and Lancaster.'

The *Rose du Roi* is a very old Damask Perpetual Rose with bright crimson flowers.

The ALBA ROSES.—Mr. Baker regards *R. alba* as probably a hybrid between *R. canina* and *R. gallica*. At present the garden hybrids form a small but choice group. They thrive under ordinary care, and the followinge xcept *Félicité* should be pruned rather closely.

For general culture and propagation see p. 882.

Belle de Ségur, soft rosy flesh, edges blush, beautiful, of medium size, full, form cupped.

Blanche Belgique, white, very floriferous.

Celestial, flesh colour, beautifully tinted with the most delicate pink, of medium size, double, cupped.

Félicité (*Parmentier*), rosy flesh, margin blush, large and full.

Lorna Doone, deep rose.

Madame Audot, glossy flesh, large and full.

Madame Legras, creamy white, large and full.

Maiden's Blush, soft blush, of medium size.

Mrs. Paul, bold white flowers tinted with rose.

MULTIFLORA or POLYANTHA ROSES.—A very pretty and ornamental class of miniature or fairy Roses which have been much improved by the additions made during the last season or two. The plants are very compact in habit, and bear in great profusion pretty small double flowers. They are admirably suited for pot culture as conservatory plants or for edging Rose beds.

The Polyantha Roses have been spoken of very favourably as stocks for other varieties, and may in the future be more extensively used for that purpose.

For general culture and propagation see p. 882.

The following are some of the best known varieties:—

Aglaia (*Yellow Rambler*), bright canary-yellow flowers, produced in pyramidal clusters, very hardy.

Cecile Brunner, blush, shaded pale pink, very free-flowering, one of the best.

Euphrosyne (*Pink Rambler*), buds carmine, changing to pure rose; a cluster Rose.

Gloire de Polyantha, a miniature flower, deep rose, with a white base to the tiny petals.

Golden Fairy, bright fawn, tinted white.

Jeanne Ferron, pink, lighter colour as the flower expands, reflexed, a good climber.

Ma Paquerette, pure white.

Mignonette, rosy pink, a beautiful miniature Rose.

Red Pet, rich crimson, very small, very free-flowering.

The Pet, delicate pink, changing to white.

Turner's Crimson Rambler, a fine introduction from Japan, producing large clusters of brightest crimson flowers. The plant is of very vigorous growth, producing shoots 8–10 ft. long in one season. A grand variety for climbing or pegging, very hardy, free-flowering, and a continuous bloomer. It succeeds on the

Manetti stock or on its own roots, better than when budded on the Dog Rose. Cuttings of the ripened shoots will also root freely and make good plants.

AYRSHIRE ROSES (R. ARVENSIS OR REPENS, VAR.).—The Ayrshire Roses are usually considered to be descended from the common Field Rose (*R. arvensis* or *repens*). From their hardiness, and rapid growth, they are admirably adapted for planting in rough situations where choicer kinds will not thrive, and for climbing over banks, trees, pillars, buildings &c. When grafted or budded on tall stems they also make excellent weeping Roses.

They are of the easiest cultivation in ordinary good and well-drained garden soil, and will respond to the best of treatment as given to the Tea-Scented and Hybrid Perpetual varieties. They require little or no pruning, so long as the shoots are not allowed to get entangled and overcrowded. The following are some of the best varieties. For general culture and propagation see p. 382.

Alice Gray, white, delicately edged with pink.

Bennett's Seedling, a lovely double white-flowered variety.

Dundee Rambler, white, with pink edge.

Princess Victoria, pale flesh.

Queen of the Belgians, creamy white, double.

Rivers' Ayrshire Queen, reddish-purple.

Ruga, pale flesh, very fragrant.

Splendens, pale flesh, buds crimson.

Virginian Rambler, a very free-flowering variety with beautiful pinky-white blossoms.

EVERGREEN ROSES (R. SEMPERVIRENS).—These are valuable climbing Roses, blooming in large clusters of ten to fifty blooms each, and holding their dark green shining foliage through a great part of winter; they are free growers and quite hardy. Like the *Ayrshire*, they form beautiful weeping Roses. In pruning the head should be well thinned out, a few of the more pendant shoots being left their whole length; these will flower to their very points. For general culture and propagation see p. 382.

Donna Maria, pure white, small and double.

Félicité Perpetue, creamy white, beautiful, small and full, one of the finest.

Flora, rosy flesh, full. It has pretty red shoots and glossy green leaves which stand smoky atmosphere well.

Leopoldine d'Orléans, white, tipped with red, small and double.

Myrianthes Renoncule, blush edged with rose, small and double. A beautiful variety.

Princess Marie, a double pink-flowered variety which retains its leaves somewhat longer than the others.

FRENCH, GALLICA, or GARDEN ROSES (R. GALLICA).—These Roses grow anywhere, but become of greatly increased beauty under good cultivation. They may be distinguished by their stiff erect growth. As standards they form compact heads, which display the flowers to great advantage. The flowers are remarkable for their brilliant and richly varied hues, fulness, regularity, and a delicious fragrance. They require moderately close pruning. The striped varieties of this section (*Rosa Mundi*, &c.) are often called *York and Lancaster*.

For general culture and propagation see p. 382.

Blanchefleur, white slightly tinted with flesh.

Boule de Nanteuil, crimson-purple, centre sometimes fiery.

Cynthie, pale rose, light margin, beautiful, large.

D'Aguesseau, crimson richly shaded with purple, large and full.

Duchess of Buccleuch, dark rose, margin blush, beautiful.

Kean, rich velvety purple, centre scarlet.

Œillet Parfait, pure white with broad stripes of rosy crimson, beautiful, very double.

Ohl, dark crimson and scarlet shaded, large.

Perles des Panachées, white, striped with rose.

Rosa Mundi, red striped with white, sometimes all red; large and semi-double.

Village Maid, white striped with rose and purple, large and full, of cupped form.

HYBRID SWEET BRIARS.—These lovely Hybrids raised by Lord Penzance are crosses between the Common Sweet Briar and various old-fashioned Garden Roses; the flowers are single or semi-double, and vary in colour from pale yellow to crimson. The plants are very vigorous and perfectly hardy and the foliage of all of them is as sweetly scented as the Common Sweet Briar. They form a distinct break from any class of Rose yet in commerce. They are excellent plants for making hedges, and by pegging the shoots down as described above at p. 884 these Sweet Briars form one of the most effective sights in the garden, especially when they have become well established. Not only are their flowers lovely in every way, but the sweet fragrance of the plants is a character of the highest importance.

For general culture and propagation see p. 882.

Amy Robsart, a lovely deep rose, an abundant bloomer, robust and free.

Anne of Geierstein, dark crimson, followed by an abundance of pretty clustered bunches of hips. It is a strong grower and would make an excellent hedge.

Brenda, soft blush or peach, handsome in colour and shade.

Catherine Seton, a very pleasing tint of soft rosy pink, the bright golden anthers being very prominent, very free-flowering, perpetual, and a good Autumnal Rose.

Edith Bellenden, pale rose, flowering profusely in clusters at the ends of the shoots, which are long and pendulous.

Flora McIvor, pure white, blushed with rose, perfect for cutting.

Green Mantle, bright rich pink, with a band of white encircling the anthers, which, with their background of white, have a very pretty effect. This variety, too, is very free-flowering, and a good Autumnal Rose.

Jeannie Deans, semi-double, very large, scarlet-crimson, flowering freely in clusters, foliage of a deep, healthy-looking green, and very strong growing.

Julia Mannering, soft pearly or porcelain pink, the prettiest of all the pink varieties, very free-flowering, thoroughly perpetual, with flower and foliage deliciously scented.

Lady Penzance, copper-tinted yellow. This is a grand Sweet Briar and probably the finest for giving beautiful effects.

Lord Penzance, fawn colour.

Lucy Ashton, white, pink edges.

Lucy Bertram, a fine deep crimson, the richest colour of all; the centre is pure white, which shows off the bright yellow anthers to good advantage; branching habit, free-flowering, a good Autumnal Rose.

Meg Merrilies, crimson.

Mina, large pure white, opening with a tint of palest blush, bushy habit, foliage like a Scotch Briar.

Rose Bradwardine, clear rose.

HYBRIDS of CHINESE, BOURBON, and NOISETTE ROSES (R. GALLICA).—The Roses in this section are Hybrids between the Gallica, Centifolia, &c., and the Chinese, Noisette, and Bourbon. Most of them grow to perfection as Wall or Pillar Roses. In pruning they should be well thinned out, and the shoots left for flowering shortened but little. The moderate growers, like *Comtesse Lacépède* and *Souvenir de Pierre Dupuy*, require closer pruning. These Hybrids are still valuable, frequently concentrating in the same flower perfection in the desired points—form, fulness, and size; and further, many of them are brilliant in colour. For general culture and propagation see p. 882.

The following are some of the best varieties grown:—

Blairii No. 2, blush-pink, fine, very large and double.

Brennus or *Brutus*, deep carmine, superb, very large and full.

Charles Lawson, vivid rose shaded, large and full; one of the best.

Charles Duval, deep pink, large and full, cupped.

Chenedole, light vivid crimson, colour exquisite, very large and double; a fine pillar Rose.

Comtesse Lacépède, silvery blush, sometimes rosy flesh, large, full, cupped.

Coupe d'Hébé, rich deep pink, large and very double; one of the best.

Fulgens, deep crimson; a good climbing Rose.

General Jacqueminot, deep purple, shaded with crimson.

Juno, pale rose, blush edges, very large and full.

Madame Barriot, light rose, shaded.

Madame Plantier, pure white, free bloomer, beautiful, full; the finest of all pure white Roses for massing.

Madeline, white, usually margined with crimson.

Paul Perras, beautiful pale rose, fine, very large and full.

Paul Ricaut, bright rosy crimson, large and full; one of the best.

Paul Verdier, magnificent bright rose, large, full, and perfectly imbricated; good Rose.

Souvenir de Pierre Dupuy, deep velvety red, very large and double; fine.

Vivid, vivid crimson, very showy; a fine pillar or climbing Rose.

William Jesse, purplish-crimson, tinged with lilac, large and double.

Climbing Roses

Although the best Climbing Roses have already been mentioned in the sections to which they belong, it may be convenient to have a separate list of them for ready reference. With the exception of the Banksian Roses (see p. 396) most of the Climbing Roses are easily grown, and their general culture and propagation are as detailed at p. 382. Their great value for garden purposes consists in the many ways they may be utilised for the ornamentation of parts of the garden where no other plant would be so effective or so appropriate, or give such a wealth of blossom and variety of colour. Old trees, old buildings, walls, sheds, arbours, pergolas, arches, trellises, banks, and almost any place where long rambling branches will go, are suitable places for Climbing Roses, provided they are judiciously planted, and not overcrowded.

The following is a list of some of the best Climbing Roses:—

HYBRID PERPETUAL CLIMBERS

Climbing Duchess of Norfolk (p. 386).
Climbing Etienne Levet (p. 386).
Climbing Jules Margottin (p. 386).
Climbing Star of Waltham (p. 387).
Climbing Victor Verdier (p. 387).
Paul's Carmine Pillar (p. 388).
Climbing Edouard Morren (p. 388).
Climbing La France (p. 388).
Climbing Marie Cointet (p. 388).
Climbing Queen of Queens (p. 388).
Princess Louise Victoria (p. 389).

TEA-SCENTED CLIMBERS

Climbing Kaiserin Augusta Victoria (p. 393).
Climbing Perle des Jardins (p. 391).
Climbing Devoniensis (p. 391).
Climbing Niphetos (p. 391).
Cheshunt Hybrid (p. 392).
Gloire de Dijon (p. 391).
Longworth Rambler (p. 392).
Reine Marie Henriette (p. 392).

NOISETTE CLIMBERS AND THEIR HYBRIDS

Aimée Vibert (p. 393).
Alister Stella Gray (p. 393).
Blairi No. 1 (p. 394).
Comtesse de Galard Bearn (p. 393).
Jaune Desprez (p. 393).
Rêve d'or (p. 394).
Vivid (p. 400).
Wm. Allen Richardson (p. 394).

OTHER CLIMBING ROSES

Ayrshire, see varieties (p. 398).
Banksian varieties (p. 396).
Cramoisie supérieure (monthly), (p. 394).
Evergreen varieties (p. 398).
Multiflora or *Polyantha varieties* (p. 397).
Musk Roses (R. moschata) (p. 403).
R. setigera (p. 404).
R. wichuriana (p. 405).

WILD ROSES.—Besides the florist's Rose, there are several beautiful natural species which deserve a place in the garden. Of course one of the greatest differences between the two groups is that the flowers of the wild species are usually single, and have the general characters as described at p. 382. In the garden forms the numerous stamens have been transformed into petals, hence the 'doubling.'

Culture and Propagation.—They thrive in good soil, but it is not necessary to take the same amount of trouble over pruning them as with Hybrid Perpetuals and such like. A thinning out of the branches and dead wood here and there is sufficient, and very little shortening back of the shoots is required during the year. They are not nearly so much subject to disease and insect pests as the garden varieties, and the fact that they vary a good deal in habit—from dwarf sturdy bushes to long-branched climbers—enables one to use them in many ways.

They may be increased by seeds, but owing to the ease with which some of them hybridise, the progeny may not come quite true. They are probably best obtained by layering the branches, and thus getting them on their own roots. The following is a selection:—

R. acicularis.—A native of North temperate regions, with very prickly stems and very glaucous leaves, composed of about 7 oval, slightly rugose, serrated leaflets. Flowers in June, pale blush, solitary, fragrant, followed by yellowish-orange obovoid fruits.

Culture &c. as above.

R. alba.—This is of garden origin, and has given rise to the 'Alba' roses (see p. 397). It grows 4–7 ft. high, with straight or falcate prickles, oblong, glaucous, serrated leaflets, and very fragrant, white or delicate blush blooms in June and July. Fruit scarlet or blood-red, oblong, unarmed. There is a sweet-scented variety called *suaveolens*.

Culture &c. as above.

R. alpina.—A native of Europe, about 8 ft. high, with prickles on the young stems. Leaflets 5–11, ovate or obovate, sharply serrated. Flowers in June, pink or rose. Fruit orange-red, ovate or roundish, drooping. The Boursalt Roses (see p. 395) originated from this.

Culture &c. as above.

R. altaica.—A beautiful species 3–4 ft. high with white flowers 2–3 in. across, produced during May and June. The bundle of bright yellow stamens in the centre is in good contrast to the roundish wedge-shaped petals.

Culture &c. as above.

R. beggeriana.—A pretty shrub 4–6 ft. high, native of Central Asia. The leaves are composed of 3–4 pairs of small elliptic serrate leaflets, and furnish slender branches having only a few recurved spines but no prickles. The small white flowers are borne in rather large corymbs, and continue to appear throughout the summer months. They are afterwards succeeded by fruits not much larger than a pea, at first orange-red, but turning deep purple-black when ripe.

Culture &c. as above.

R. bracteata (*Marcartney Rose*).—An erect woolly Chinese plant about 2 ft. high, armed with strong, recurved, often twin prickles. Leaflets 5–9, obovate, slightly serrated, smooth, shining. Flowers in July, large, white, solitary and sweetly scented. The variety *alba simplex* has a conspicuous mass of yellow stamens in the centre, while *Marie Leonida* has large double white flowers, creamy blush in the centre.

Culture &c. as above. The Macartney Roses, though somewhat tender, are very pretty and distinct and almost evergreen. They repay for a little care and should be grown in warm sunny spots on a south wall or fence.

R. canina (*Dog Rose*).—A handsome British Rose forming large bushes in our thickets and hedges, and having arching prickly branches with smooth or slightly hairy and sharply toothed leaflets. The beautiful cup-shaped blossoms, 2–3 in. across, appear in June and July, and vary from pure white to deep rose in colour. There are many varieties of the Dog Rose.

Culture &c. as above. Excellent for hedges, and for stocks.

R. carolina (*Carolina Swamp Rose*). A pretty N. American species 4–7 ft. high, armed with stout hooked prickles. Leaflets 5–9, elliptical. Flowers from June to September, pink, in corymbs of a dozen or more. Fruit somewhat bristly.

Culture &c. as above.

R. centifolia (*Provence* or *Cabbage Rose*).—A pretty Rose 3–6 ft. high, native of the East, with prickly branches and leaves composed of 5–7 ovate serrate leaflets slightly hairy on the under surface. The large sweet-scented rose-purple flowers appear in June and July and are succeeded by fragrant top-shaped 'hips.' The variety *muscosa* with rose or white flowers is the origin of the Moss Rose (see p. 395).

Culture &c. as above.

R. damascena (*Damask Rose*).—This, the parent of many garden forms (see p. 397), is a native of the East, and makes bushes 2–4 ft. high. It has very prickly stems and leaves composed of 5–7 ovate stiffish leaflets. The large sweet-scented white or rosy flowers are borne in trusses in June and July, and have clammy hairy calyces.

Culture &c. as above.

R. ferruginea (*R. rubrifolia*).—A European species like the 'British Dog Rose.' It has deep red or purple stems about 6 ft. high, armed with small short hooked prickles. Leaflets ovate, toothed, very glaucous, and brightly tinged with red, wrinkled. Flowers in August, deep red, small. Fruit purple-red with a soft flesh.

Culture &c. as above.

R. gallica.—A native of Southern Europe and Western Asia 2–3 ft. high, with prickly stems and 5–7. ovate or lance-shaped leathery leaflets composing the leaves. The flowers, which vary from red to crimson and are double or semi-double, appear in June and July.

Culture &c. as above. Several garden Roses have originated from this species.

R. gigantea.—A magnificent Indian climbing Rose with stems often reaching a length of 40 ft. Flowers pure white, 6 in. or more across, golden-yellow in bud. This species has not yet been flowered in the British Islands, but has done so in the south of France. It is hardy in the milder parts of the kingdom, and it may some day astonish its possessors by showing its beautiful blossoms.

Culture &c. as above, p. 382.

R. Godefroyæ.—A compact, smooth-stemmed bush, native of Persia, with shining dark green leaves, having 5–7 leaflets. Flowers in summer, large, with numerous white petals.

Culture &c. as above, p. 382.

R. Hardi.—This is supposed to be a hybrid between the simple-leaved and yellow-flowered *R. simplicifolia* and the white-flowered *R. involucrata* which has compound leaves. It is a rather pretty Rose with leaves composed of 5–7 serrate leaflets, the terminal one of which is much larger than the others. The flowers resemble those of a Cistus (see p. 228), being 2 in. across and soft yellow in colour with a crimson blotch at the base of each notched petal. It grows and flowers more freely than *R. simplicifolia*.

Culture &c. as above, p. 382.

R. hemisphærica (*R. sulphurea*).—A beautiful species about 8 ft. high, native of the East, with somewhat spiny stalks. Leaves composed of 5–7 obovate toothed leaflets, paler beneath, and downy on the nerves. Flowers in summer, soft yellow.

Culture &c. as above, p. 382.

R. hispida (*R. lutescens*).—A species closely allied to the Scotch or Burnet Rose, but of uncertain origin. It grows 5–6 ft. high, with prickly branches and leaves having 7 oval, sharply toothed leaflets. Flowers in June, white tinged with soft yellow.

Culture &c. as above, p. 382.

R. indica (*Blush*, *Common China*, or *Monthly Rose*).—A stout, brown-prickled species, probably native of China, notwithstanding its name. Leaflets 3-5, shining, elliptic acuminate, crenate serrate, dark above, glaucous beneath. Flowers at all seasons (hence the name Monthly Rose), usually semi-double, red, numerous. Fruit scarlet, obovate.

This species has played an important part in the production of the China or Bengal Roses (see p. 394), the Bourbon (p. 394), and the Tea Roses (p. 389).

The 'Green Rose' called *monstrosa* is a variety of *indica*.

Culture &c. as above, p. 382.

R. involucrata (*R. Lyelli*).—A pretty Indian Rose about 3 ft. high, with leaves 3–4 in. long, and composed of 3 or 4 pairs of elliptic oblong finely serrate leaflets. The white sweet-scented flowers, each 2–3 in. across, are produced in July and August either singly or in small clusters, and are succeeded by round, woolly-stemmed fruits.

Culture &c. as above, p. 382.

R. lævigata (*R. sinica*).—*Cherokee Rose.*—A Chinese Rose, now naturalised in the United States and West Indies. It has long trailing stems, the branches armed with stout, curved prickles and evergreen, usually 3-foliolate, smooth and shining leaves, hairy on the midribs. Flowers in June, white, large, solitary. Fruit orange-red, warty. Rather tender.

Culture &c. as above, p. 382.

R. lucida.—A beautiful N. American Rose 1–2 ft. high, armed with bristly prickles. Leaflets shining green, 5–9 elliptic or oblong lance-shaped, sharply serrated. Flowers from May to July, red, 1–3 on a stalk. The variety *flore pleno* has charming double flowers. It is known as 'Rose Button.' The fruits of this Rose are deep red, about the size of a Hazel-nut, and look handsome among the autumn-tinted foliage.

Culture &c. as above.

R. lutea (*R. Eglanteria*).—*Austrian Briar.*—An Eastern species about 3 ft. high, with straight prickles. Leaves 1½–3 in. long; leaflets 2–4 pairs, elliptic ovate or roundish, deeply toothed. Flowers in June 2–2½ in. across. The variety *punicea* has flowers scarlet inside, yellow outside, and purple stigmas. There is also a form (*flore pleno*) with double flowers which looks particularly attractive when laden with blossom.

The best known forms are the Austrian Yellow and Austrian Copper Briars with beautiful single flowers. *Harrisoni* and the *Persian Yellow* are also fine golden-yellow. The latter has leaves scented like Sweet Briar. When pruning the head should be well thinned, but the shoots intended for flowering should be allowed to remain long.

Culture &c. as above, p. 382.

R. macrophylla. — A distinct prickly Rose, about 6 ft. high, native of Thibet. Leaves 2–8 in. long, with elliptic ovate, finely toothed leaves usually downy beneath. Flowers in summer, pink, 1–3½ in. across, with broadly obcordate petals. Fruit sometimes 2 in. long.

Culture &c. as above, p. 382.

R. microphylla. — A sturdy Chinese shrub, 2–4 ft. high, with only slightly prickly stems and small ovate leaflets 9–15 in number. Flowers from August to October, rather large, delicate rose, very fragrant. Fruits large, globular, prickly, green or yellowish when ripe, exhaling a Pineapple odour.

There is a double-flowered variety (*flore pleno*) which has been much longer in cultivation than the type.

Culture &c. as above, p. 382.

R. minutifolia. — A compact-growing Californian Rose, the stems of which are armed with numerous straight spines, and clothed with very small leaves having 5–7 deeply toothed leaflets. The small solitary pink or white flowers are produced on short spurs along the branches.

Culture &c. as above, p. 382.

R. mollis.—A British species forming a large bush with erect or arching prickly stems and very hairy leaves. The red flowers appear in June and July and are succeeded by roundish or top-shaped fruits usually densely covered with prickles.

Culture &c. as above, p. 382.

R. moschata (*R. Brunoni*). — *Musk Rose.*—A native of S. Europe to India, with climbing stems 20 ft. or more in length. Leaves 2–6 in. long, with 2–4 pairs of ovate or ovate-lance-shaped acute leaflets, sharply serrated, somewhat downy beneath. Flowers in July and August, about 2 in. across, yellowish-white, very numerous, in compound corymbs and delicately fragrant. This is one of the reputed parents of the Noisette Roses (see p. 398), and is excellent for cutting purposes. In the variety *nivea* the blossoms are pure white sometimes flushed with pink.

Musk Roses are of rapid growth, best adapted for climbers; they require little pruning. The flowers have a peculiar Musk-like scent as a point of distinction, but it requires a still, moist atmosphere to be readily appreciable.

The following are good varieties :—

Eliza Werry, nankeen-yellow, changing to white.

Fringed, white, petals serrated; cupped.

Princesse de Nassau, yellowish straw, cupped, very sweet.

Rivers, pink shaded with buff.

R. multiflora (*R. polyantha*). — A native of China and Japan, with stems about 12 ft. long, having scattered slender prickles. Leaflets ovate lance-shaped, slightly wrinkled. Flowers in June, white, pink, or purple, in corymbs. Fruits bright red. *Carnea* is a double pink-flowered form; *flore pleno* differs from the type only in its double flowers, and *platyphylla* has broader leaflets and purple double flowers.

The 'Dawson Rose' is a hybrid between *R. multiflora* and the crimson Hybrid Perpetual 'General Jacqueminot.' It has gracefully arching sprays of semi-double pink and white blossoms, 12–20 in a cluster, during June and July. It is an elegant Rose for massing in beds on grassland.

Culture &c. as above, p. 382.

R. nutkana.—A distinct species from N.W. America, having rather broad smooth or downy leaves, at the base of which there are usually some broad flat spines, and occasionally scattered prickles. The flowers are borne in loose corymbs, and are succeeded by round bright scarlet fruits about ½ in. in diameter.

Culture &c. as above, p. 382.

R. pisocarpa (*R. pisiformis*).—An interesting Californian Rose having smooth reddish stems armed with straight prickles. It makes a long straggling freely branched bush clothed with rather small leaves of 5 leaflets. The bright pink flowers, each about an inch across, appear in twos and threes in summer, and are followed by roundish red fruits about ½ in. through, which look very attractive.

Culture &c. as above, p. 382.

R. Pissardi.—A beautiful species 15–20 ft. high, native of the Caspian shores. The spiny glaucous branches are spreading or bent downwards, and are furnished with deep green leaves. The sweet-scented white or blush-white blossoms are semi-double; they appear late in summer and are produced in great abundance in upright corymbs, being succeeded by deep red fruits.

Culture &c. as above, p. 382.

R. pomifera (*Apple Rose*).—This is an old-fashioned British Rose with glaucous foliage. The flowers are single, blush-coloured, and succeeded by handsome scarlet fruits 1–2 in. long, apple or pear-shaped, and covered with bristles.

Culture &c. as above, p. 382.

R. repens (*R. arvensis*).—A rambling British and European species, 2–8 ft. high, from which the Ayrshire Roses have been developed. The trailing purplish glaucous stems are armed with stout strongly hooked prickles, and clothed with smooth leaflets, glaucous beneath. Flowers in summer, 1–6 in a truss, rarely solitary, white, with a yellow blotch at the base of each petal. Calyx purple. There are several forms, and also one with double flowers.

Culture &c. as above, p. 382.

R. rubiginosa (*Eglantine ; Sweet Briar*). — A delightfully fragrant pretty native Wild Rose about 5 ft. high. Leaflets glabrous above, downy beneath. Flowers in June, pink, 1–3 on a stem. It is an excellent hedge plant, and not a few places in England boast a 'Sweet Briar Lane.'

Culture &c. as above, p. 382.

R. rugosa (*Japanese* or *Ramanas Rose*).—A distinct-looking and handsome bush about 4 ft. high, native of Japan, densely armed with straight prickles. Leaflets 5–9, ovate, much wrinkled, serrated, blunt. Flowers in June, red, large, solitary. Fruit as large as a thrush egg, varying from orange-red to deep red, very handsome, with an edible pulp. There are several forms, the best of which are *alba*, with pure white flowers ; *plena*, a double crimson ; *Coubert's Double White* with beautiful satiny white flowers ; *fimbriata*, white Picotee edged petals; and *Mdme. Georges Bruant*, white, semi-double.

R. rugosa has been crossed with some of the Bengal Roses, and has produced a hybrid called *calocarpa*, and it has also been crossed with the well-known hybrid perpetual *General Jacqueminot*. There seems to be a great future before this species in the hands of the hybridist.

Culture &c. as above, p. 382.

R. sericea.—An Indian species, with smooth or slightly prickly stems which, when young, are sometimes red. Leaves 1–3 in. long, with 7–9 oblong, blunt, sharply toothed leaflets, silky beneath. Flowers in May, white, rarely pink or pale yellow, often having only 4 instead of 5 petals. The variety *pteracantha* is distinguished by having winged, thin spines, sometimes 1½ in. wide at the base.

Culture &c. as above, p. 382.

R. setigera (*Climbing* or *Prairie Rose*).—A pretty N. American climber, stems 10–20 ft., armed with stout straightish prickles. Leaflets 3–5, ovate acute, sharply serrated, smooth or downy beneath. Flowers in July, deep rose, changing to white, corymbose.

Culture &c. as above, p. 382.

R. simplicifolia (*R. berberifolia*).—An Asiatic species 2–3 ft. high, remarkable for its small, simple, Barberry-like, downy leaves and slender downy branches. Flowers in June, sweet-scented, solitary, deep yellow, with a dark crimson spot at the base of each petal.

Culture &c. as above, p. 382.

R. spinosissima (*S. pimpinellifolia*). *Burnet* or *Scotch Rose.*—A pretty British Rose, 1–4 ft. high, with very unequal crowded prickles. Leaflets 7–9, rather broad, serrated. Flowers in May and June, less than 2 in. across, white or pink, 1 or more on a stalk. The variety *altaica* is a taller growing plant with broader leaves and fine flowers.

The varieties belonging to this group all form compact bushes, flowering abundantly early in the season before most other Roses. They are not adapted for growing as standards. The flowers are small and globular, many of them as they hang on the bush looking like little balls. Their colours are yellow, white, and various shades of pink, rose, and crimson.

Culture and Propagation.—If carefully planted at first Scotch Roses will require but little attention. They are proof against frost and snow, and are rarely if ever subject to mildew or green fly.

Speaking generally they are best grown in beds by themselves, but are also suitable for covering rough banks and transforming them into a charming picture. In poor soils, they may be given a good mulching of rotted manure every autumn. Only the bright clear-coloured varieties are worth growing. For general culture &c. see p. 382.

What are known as Perpetual Scotch Roses are represented by one called *Stanwell Perpetual*, which has rosy blush flowers, often with a pink centre.

R. tomentosa.—A British and European species with arching prickly stems 6 ft. or more high. Leaves 4–5 in. long, with doubly serrate leaflets, greyish above, and more so beneath. Flowers in summer, bright rosy pink, sometimes white, about 2 in. across. There are many varieties of this species, among which may be mentioned *woodsiana*, with fine deep rose-purple flowers.

Culture &c. as above, p. 382.

R. wichuriana.—A beautiful Japanese Rose, with prostrate stems about 12 ft. long, and shining green leaves. Flowers late in summer, pure white, 1½–2 in. across, slightly raised above the creeping stems.

Lucida is a pretty hybrid variety with glaucous, reddish foliage, and bright red flowers.

Culture &c. as above, p. 382.

R. xanthina (*R. Ecæ*).—A charming dwarf, prickly species, suitable for the rockery, native of Afghanistan. Leaves with 5–9 small leaflets. Flowers in summer, golden-yellow, less than 1 in. across.

Culture &c. as above, p. 382.

Tribe VII. Pomeæ.—Trees and shrubs often with simple leaves. Calyx-tube adnate to the ovary (or carpels sunk in the top of the fleshy flower-stalk). Stamens numerous. Fruit a pome or drupe.

PYRUS (Apple, Pear, Quince, Medlar, Crab &c.).—A genus with 35–40 species of ornamental deciduous trees and shrubs, with alternate, simple or pinnate, stalked and often serrate leaves. Flowers usually in terminal cymes. Calyx tube urn-shaped or rarely top-like, 5-lobed. Petals 5, roundish, shortly clawed. Fruit fleshy, ovoid, globose or pear-shaped.

Besides the cultivated Apple, Pear, Medlar, there are many other fine flowering trees in this genus, such as the Japanese Quince, *Pyrus* (*Cydonia*) *japonica*, and the Mountain Ash or Rowan Tree, the latter being also remarkable for its masses of orange-red or scarlet fruits. Some of the finest species for the decoration of parks, gardens, pleasure grounds, &c. are described below.

Culture and Propagation.—The trees all grow well in fairly good garden soil, and many of them might be more extensively used on large lawns than is now the case. They are increased by seeds, layers, cuttings, budding and grafting, in the same way as Apples (p. 1042) and Pears (p. 1059).

P. americana (*Sorbus americana*).—*American Mountain Ash.*—A beautiful N. American tree, with oddly pinnate leaves, composed of 13–15 lance-shaped tapering, serrated leaflets. Flowers in June, white, followed by clusters of bright red berries about the size of peas.

Culture &c. as above.

P. angustifolia.—A handsome North American tree about 20 ft. high, closely related to *P. coronaria*, with simple oblong or lance-shaped leaves, usually toothed at the edges and smooth to the touch. The beautiful rose-coloured flowers appear in April and are deliciously scented. There is a double-flowered variety (*flore pleno*) apparently superior in every way to the single-flowered type. It is perfectly hardy and grows in any good garden soil, and bears a wealth of fragrant double blossoms.

Culture &c. as above.

P. arbutifolia (*P. floribunda*).—*Chokeberry.*—A pretty N. American shrub 2–10 ft. high. Leaves simple, oblong or obovate, finely serrate, woolly beneath. Flowers in May and June, white, sometimes purple-tinted. Fruit red or purple, pear-shaped or globular. The variety *melanocarpa* (*P. grandifolia*) has larger leaves, and dark purple fruits.

Culture &c. as above.

P. Aria (*White Beam Tree*).—A British tree sometimes attaining a height of 40 ft. Leaves simple or pinnatifid, 2–6 in. long, smooth above, plaited, coarsely and irregularly toothed, deeply lobed, cottony beneath. Flowers in May and June, white, ½ in. across, in loose corymbs. Fruit red or scarlet, dotted, about ½ in. in diameter. There are two or three varieties varying somewhat in the leaves and the colour of the fruits.

Culture &c. as above.

P. Aucuparia (*Mountain Ash; Rowan Tree*).—A well-known British tree 10–30 ft. high, leaves 5–8 in. long, with 6–8 pairs of linear oblong, serrate leaflets. Flowers about Whitsuntide, creamy white, in dense cymes 4–6 in. long. Fruit scarlet or orange-red. There are several forms, among them being *fastigiata*, more erect in growth; *fructu-luteo*, with yellow berries; *pendula*, with weeping branches; and *variegata*, with variegated leaves, not well marked.

Culture &c. as above.

P. baccata (*Siberian Cherry Crab*). A handsome Siberian tree 15–20 ft. high, with ovate acute serrated leaves on long stalks. Flowers in April and May, white, crowded. Fruit yellow tinged with red, about the size and shape of a Cherry. A very variable species, chiefly recognised by its deciduous calyx lobes.

Culture &c. as above.

P. Chamæmespilus (*Cratægus Chamæmespilus; Sorbus Chamæmespilus*).—*False Quince.*—A shrub 5–6 ft. high, native of the mountainous parts of Europe. Leaves ovate, serrate, smooth, downy when young. Flowers in May and June, reddish. Fruit red, round. The variety *Hosti* has broadly elliptic, often lobed leaves, and rosy pink flowers in large terminal corymbs.

Culture &c. as above.

P. communis (*Wild Pear*).—A native tree 20–40 ft. high, with oblong-ovate acute, bluntly serrated leaves, more or less downy when young. Flowers in April and May, white, 1–1½ in. across. Fruit 1-2 in. long, pear-shaped. There are several forms, such as *cotinifolia*, *fascicularis*, *flore pleno*, *pendula*, &c.

Culture &c. as above; see also Pear, p. 1059.

P. coronaria (*Sweet-scented Crab*).—A pretty N. American tree 20 ft. high. Leaves simple, ovate, somewhat cordate, deeply toothed or lobed. Flowers in May, rosy, large, fragrant. Fruit greenish, fragrant. The variety *flore pleno* is far superior to the single-flowered type. Its blossoms are rosy white, and over 2 in. across with 2 or 3 rows of petals. The blossoms are borne in large clusters, and render this one of the finest flowering trees at the end of May.

Culture &c. as above.

P. floribunda. — A very ornamental Japanese Crab, with slender shoots and small, oblong lance-shaped, toothed leaves. Flowers in May, rich rosy red, freely produced. Fruit long-stalked, very small, roundish. There are numerous varieties, including *atrosanguinea*, with deep red flowers; *Elise Rathe*, and *pendula*, drooping habit; *Toringo* (the *Toringo Crab*), a variety with sharply cut, usually 3-lobed, downy leaves, and others; its sub-variety *Ringo* is a free-flowering, ornamental shrub with deeper-lobed leaves.

Flore pleno (also known as *Malus halleana* and *M. Parkmanni*) is a beautiful tree 10–18 ft. high, with more or less double flowers of a soft rosy tint and gracefully borne on long slender red-brown stalks.

Culture &c. as above.

P. germanica (*Mespilus germanica*). *Common Medlar.*—A free-flowering British tree 10–20 ft. high, with obovate or lance-shaped serrated leaves, somewhat downy beneath. Flowers in May and June, white, over an inch across. Fruit about 1 in. in diameter, roundish, with a depressed area at the top, and persistent calyx lobes. There are several forms.

Culture &c. as above. See also Medlar, p. 1085.

P. japonica (*Cydonia japonica*).—*Japanese Quince.*—A handsome Japanese shrub 5–8 ft. high, with smooth, oval, crenate serrate leaves. Flowers brilliant scarlet, produced in great profusion soon after Christmas, and while the plant is in a leafless state. Fruit green, fragrant, but not edible. There are several forms, usually distinguished by the brilliancy or dulness of the flowers. The white-flowered form, *nivalis*, is very pretty. There is also a semi-double variety.

Grown as a bush or against walls, the Japanese Quince always looks effective and brilliant during the dullest season of the year, and continues to blossom well into May. Small plants in pots flower freely in cold houses early in the year.

Culture &c. as above. See also Quince, p. 1085.

P. lobata (*Mespilus grandiflora*).—A Caucasian Medlar about 20 ft. high. Leaves oblong elliptic, serrate, nerves beneath, downy. Flowers in May and June, white, about ¾ in. across.

Culture &c. as above. See also Medlar, p. 1085.

P. Malus (*Crab; Wild Apple*).—A British tree about 20 ft. high. Leaves 1-2 in. long, oblong, rounded, pointed or tailed. Flowers in May, pink and white, about 1½ in. across. Fruit yellow, 1 in. in diameter, roundish. There are several varieties, the best of which are *Bertini*, remarkable for its masses of bright-coloured fruits; *cratægina*, with fruits like the Hawthorn; and *sempervirens*, the leaves of which remain long after the others have dropped. The variety *aurea* has yellow leaves with a green patch in the centre.

Culture &c. as above. See also Apple, p. 1042.

P. Maulei (*Cydonia Maulei*). — A lovely Japanese, somewhat spiny, shrub 2–4 ft. high, closely allied to *P. japonica*, than which it is dwarfer, and smaller leaved. Flowers in April, bright orange-red, numerous, followed by very fragrant orange-yellow fruits 1½–2 in. in diameter, which are excellent as a preserve.

Culture &c. as above. See also Quince, p. 1065.

P. pinnatifida (*P. fennica*).—An ornamental tree said to be a true native of the Island of Arran. It has oblong leaves 5–6 in. long, pinnately cut and toothed especially towards the base, the under surface being covered with hoary down. The white sweet-scented flowers are borne in loose corymbose clusters in May and June, and are succeeded by scarlet fruits about ½ in. long, which look remarkably pretty in autumn.

Culture &c. as above, p. 405.

P. prunifolia (*Siberian Crab*). — A Siberian tree 20–30 ft. high. Leaves ovate, pointed, serrate, like those of the Cherry tree. Flowers in April and May, white, like those of the Pear. Fruit yellowish, red on the sunny side, borne in great abundance, and of an agreeable acidulous flavour. There are several varieties of the Siberian Crab including a double-flowered one (*flore pleno*), a drooping one (*pendula*), and a scarlet-fruited one (*fructu coccineo*).

Culture &c. as above. See also Apple, p. 1042.

P. salicifolia.—A beautiful flowering tree 10–30 ft. high, native of Siberia. It has narrow lance-shaped leaves 2–3 in. long, finely toothed on the margins, and more or less hoary on the under surface. The charming pure white flowers, about an inch across, are borne in dense corymbs during the spring months, and their purity is enhanced by the dark stamens in the centre.

P. sinensis (*Sandy Pear; Snow Pear*).—A Chinese tree, with leaves like those of the common Pear, but larger, and almost evergreen, the young ones being rendered very conspicuous in spring by their bronzy-red tint. Flowers in April, white. Fruit Apple-like, warty, and gritty flavoured.

Culture &c. as above, p. 405.

P. Sorbus (*Sorbus domestica*). — A native of Britain 20–60 ft. high. Leaves pinnate; leaflets toothed near the apex, cottony beneath. Flowers in May, creamy white. Fruit red, pear-shaped, about 1 in. long, painfully irritable when unripe, but mellowed and rendered edible by frost.

Culture &c. as above, p. 405.

P. spectabilis. — A beautiful Chinese tree 20–30 ft. high. Leaves oval oblong, serrated, smooth. Flowers in April and May, pale red, large, semi-double when open, in sessile umbels. There is a Japanese variety called *Kaido*, with numerous blush-white flowers, wine-red in centre.

Culture &c. as above, p. 405.

P. Torminalis.—A tree 10–50 ft. high, native of Britain, Europe, and N. Africa. Leaves 2–4 in. long, oblong ovate or cordate, 6–10-lobed, lobes triangular, pointed. Flowers in April and May, white, ½ in. across, very numerous. Fruit pear-shaped, greenish-brown, dotted. The variety *pinnatifida* has more deeply cut leaves. *P. cratægifolia* from N. Italy is closely related, but may be distinguished by the thinner texture of the leaves. The flowers are pure white and very showy.

Culture &c. as above, p. 405.

P. vestita (*P. lanata; P. nepalensis*). *Himalayan Beam Tree.* — A fine tree 20–30 ft. high, with large ovate-acute or elliptic leaves, silvery white when young, gradually becoming smooth and shining green. Flowers in April and May, white, in woolly corymbs. Fruit greenish-brown, about the size of a small Cherry.

Culture &c. as above.

P. vulgaris (*Cydonia vulgaris*). — *Common Quince.*—A native of S. Europe, 20 ft. high. Leaves ovate, whitish beneath. Flowers in May and June, white or pale red, large. Fruit more or less pear-shaped, with a peculiar, rather pleasant aroma. The variety *lusitanica*, the Portugal Quince, has larger leaves and fruit, and is a good stock for Pears.

Culture &c. as above. See also Quince, p. 1085.

CRATÆGUS (HAWTHORN; WHITETHORN; MAY; QUICK).—A genus with 65 species of beautiful deciduous trees and shrubs, often spiny. Leaves simple, lobed or pinnately cut. Flowers in terminal corymbose cymes. Calyx tube urn-shaped or bell-shaped, 5-lobed. Petals 5. Stamens many. Fruit ovoid or globose, with hard bony cells or stones.

Culture and Propagation.—All the Hawthorns thrive in any fairly good soil, and the following kinds are all more or less worth growing when space can be found for them, although the white and red May trees are sure to be the first favourites. Most of the kinds are increased by budding or grafting on the common Hawthorn which may be raised from seeds sown either in drills or beds, after the pulp surrounding the bony 'seeds' has been rotted away. It is, however, more satisfactory to obtain well-established young trees from a nurseryman.

C. apiifolia.—A native of the United States 8–10 ft. high. Leaves deltoid, 5–7-cleft, acutely lobed and toothed. Flowers in May and June, white. Fruits deep red, ovoid.

Culture &c. as above.

C. Azarolus.—A tree 15–20 ft. high, native of S. Europe. Leaves downy, trifid, with blunt, coarsely toothed lobes. Flowers in May, white, sweet-scented. Fruit red or yellow, ovoid globose, agreeable when ripe.

Culture &c. as above.

C. Carrierei.—A handsome Thorn of hybrid origin with oblong wedge-shaped serrate leaves and clusters of large white flowers in May, succeeded by large scarlet fruits resembling Cherries in autumn.

Culture &c. as above.

C. coccinea (*Scarlet-fruited Thorn*). A native of the United States, 20–30 ft. high. Leaves roundish-ovate, sharply toothed and cut, smooth. Flowers in May, white. Fruit bright coral-red, ovoid, large. Among the several varieties the best known are *corallina*, *glandulosa*, *indentata*, *macracantha* (with long curved spines), *maxima*, *minor*, *neapolitana* and *subvillosa*.

Culture &c. as above. In France *C. coccinea* has been found to be a much superior stock to the Common White Thorn for grafting or budding purposes. It might be well to try it in the United Kingdom, especially as it can be quickly raised from seeds.

C. cordata (*C. populifolia*).—*Washington Thorn.*—A native of the United States 6–10 ft. high. Leaves broadly ovate or triangular, mostly truncate or slightly cordate at the base. Flowers in May and June, white. Fruit red, very small, roundish.

Culture &c. as above.

C. crenulata.—A beautiful evergreen Thorn, native of the Himalayas. The somewhat drooping branches are thickly furnished with bright green crenulate leaves. The white flowers appear in May and are succeeded by large clusters of brilliant scarlet haws in autumn and winter.

Culture &c. as above. In unfavoured parts of the kingdom it is safer to grow this species on a south wall, although in the south and west it may be grown as a bush. It requires little or no pruning for several years.

C. Crus-Galli (*C. lucida*).—*Cockspur Thorn.*—A North American tree 10–30 ft. high, remarkable for its very long spines. Flowers in May, white tinged with red. Fruit scarlet, eatable. The variety *linearis* has linear lance-shaped leaves, and few shorter spines; *nana*, ovate lance-shaped leaves; *ovalifolia*, ovate rather hairy leaves, semi-cordate serrate stipules, and white flowers; *prunifolia*, broadly ovate, unequally toothed leaves, white flowers; *pyracanthifolia*, oblong lance-shaped, Willow-like leaves; and *splendens*, with obovate wedge-shaped leaves.

Culture &c. as above.

C. Douglasi.—A native of N.W. America, 10–15 ft. high, with rigid spines. Leaves obovate or oval, doubly serrate, smooth. Flowers in May, white. Fruit dark purple, almost black, small.

Culture &c. as above.

C. flava (*C. caroliniana; C. glandulosa*).—A tree 12–20 ft. high, native of the United States. Leaves obovate wedge-shaped, somewhat lobed, crenate-serrate; stipules heart-shaped. Flowers in May, white, usually solitary. Fruit yellow, Pear-shaped, edible.

Culture &c. as above.

C. florentina.—A native of Florence 20–30 ft. high. Leaves ovate oblong, deeply serrated, downy beneath. Flowers in May, white, ovoid, globose.

Culture &c. as above.

C. heterophylla.—An Eastern tree 10–20 ft. high. Leaves smooth, wedge-shaped-lanceolate, somewhat 3-lobed and cut at the apex. Flowers in May, white.

Culture &c. as above.

C. melanocarpa (*C. Oxyacantha oliveriana*).—A native of Tauria 10–20 ft. high. Leaves usually 3-cleft, serrated towards the apex. Flowers in May and June, white. Fruit black.

Culture &c. as above.

C. nigra (*C. carpatica*).—A tree 10–20 ft. high, native of E. Europe. Leaves lobately sinuated, serrate, glossy green above, downy beneath; stipules oblong, doubly serrate. Flowers in May and June, white. Fruit black.

Culture &c. as above.

C. odoratissima.—A Crimean tree 10–20 ft. high. Leaves deeply cut, downy, with sharp lance-shaped serrated lobes. Flowers in May and June, white, very sweet-scented. Fruit large, roundish, yellow.

Culture &c. as above. This species is closely related to *C. orientalis*.

C. orientalis (*C. sanguinea*).—A native of the Levant 12–20 ft. high; with hoary branches. Leaves 3-lobed, downy beneath; lobes ovate, deeply toothed at the apex. Flowers in May and June, white.

Culture &c. as above.

C. Oxyacantha (*Common Hawthorn; May*).—A well-known British tree 10–20 ft. high. Leaves obovate wedge-shaped, 3-cleft or pinnately cut, smooth, shining. Flowers in May and June, white, sometimes pink, sweet-scented. Fruit crimson-red, occasionally orange.

There are many fine forms of the Hawthorn, the best being *aurantiaca*, with orange-yellow fruits; *aurea*, distinct, with golden-yellow fruits; *eriocarpa*, with woolly fruits and clear whitish bark; *ficifolia*, *laciniata*, and *pteridifolia*, all with finely cut leaves; *flore-pleno alba*, double white flowers changing to pink with age; *præcox*, the Glastonbury Thorn, sometimes in flower at Christmas in mild winters; *carminata* or *rosea*, pink petals with white claws; *rosea-superba* (or *punicea*), with large, dark red flowers; Paul's Double Scarlet, and several others.

Culture &c. as above. The Scarlet Thorns, or 'Mays' as they are popularly termed, are extensively planted in villa and suburban gardens, and are usually grown as mop-headed standards grafted on the commoner kind.

C. pinnatifida.—A distinct Chinese Thorn 6–10 ft. high, with broadly oval leaves divided into 2–4 long pointed toothed lobes on each side; they are smooth above and downy on the nerves beneath. The white flowers appear in May in erect corymbose clusters before many of the other Thorns. The variety *major* is more ornamental than the type. It has long-stalked, lobed and pinnately divided leaves, large white flowers in clusters, and bright red pear-shaped fruits about ¾ in. in diameter. It looks very handsome in autumn.

Culture &c. as above, p. 408.

C. Pyracantha (*Evergreen Thorn; Pyracanth*).—A beautiful and well-known tree 10–20 ft. high, native of S. Europe. Leaves smooth, ovate lance-shaped, crenate. Flowers in May, white. Fruits of a beautiful scarlet, as large as peas, remaining on the trees during winter. There are only one or two varieties, of which *Lalandi*, which fruits more freely than the type, and *pauciflora*, a dwarfer form, are the best.

The Pyracanth does well on a wall, and looks handsome grown as a pyramidal tree. As the birds are very fond of the fruits, a net over them will check their thieving.

Culture &c. as above, p. 408.

C. sinaica (*C. Aronia; C. maroccana*). A native of S. Europe 15–20 ft. high. Leaves wedge-shaped, 3-lobed and pinnately cut, smooth; stipules cut. Flowers in May and June, white. Fruit scarlet.

Culture &c. as above, p. 408.

C. tanacetifolia (*Tansy-leaved Thorn*). A native of the Levant, 12–20 ft. high. Leaves deeply cut, downy, with oblong-acute, few-toothed lobes. Flowers in May, white; calyx lobes acute, hairy, reflexed. Fruit greenish-yellow, round.

Culture &c. as above, p. 408.

COTONEASTER. — A genus containing about 20 species of erect or trailing trees or shrubs. Leaves simple, leathery, entire, usually woolly or white beneath (a fact not mentioned again in the descriptions below), often evergreen. Flowers in axillary and terminal cymes, or solitary. Calyx-tube 5-lobed. Petals 5. Stamens many. Fruit an ovoid, top-shaped, or roundish drupe, containing 2–5 seeded stones.

According to soil, situation, and mildness or otherwise of the season, the deciduous kinds either retain their leaves for a greater portion of the year, or lose them at the usual period. The evergreen kinds, even when not in bloom or berry, have a peculiarly graceful and ornamental appearance in the depth of winter. The dwarfer kinds might be used with advantage for covering banks or rising ground, or for making thickets or coverts.

The accompanying list will show at a glace the evergreen and the deciduous species.

Evergreen

C. buxifolia
C. microphylla
C. pannosa
C. rotundifolia
C. thymifolia

Deciduous

C. acuminata
C. affinis
C. bacillaris
C. frigida
C. horizontalis
C. integerrima
C. laxiflora
C. multiflora
C. Nummularia
C. Simonsi
C. tomentosa.

Culture and Propagation.—Cotoneasters grow well in ordinary soil, and are ornamental trained against a wall, or to fill up a corner in the shrubbery or border. They may be increased by seeds sown in spring, or better still in autumn as soon as ripe; by cuttings and layers in autumn, or by grafting in March on *C. Simonsi* and *C. integerrima*, the Quince (*Pyrus vulgaris*), or the Hawthorn (*Cratægus Oxyacantha*). Plants are so readily raised by means of seeds, cuttings, and layers that it is astonishing that grafting is at all practised.

C. acuminata. — A deciduous Himalayan species 10 ft. or more high. Leaves 1½–2 in. long, tapering to a point, very hairy when young, smooth when old. Flowers pinky white, 2 or more together on very short cymes. Fruit large, handsome, scarlet.

Culture &c. as above.

C. affinis. — Closely related to *C. bacillaris* and *C. frigida*, native of Nepaul. It is shorter and stiffer in habit than the two species mentioned, and has the under surface of the leaves covered with a woolly down.

Culture &c. as above.

C. bacillaris.—A bold, large-growing deciduous species, 15–20 ft. high, from Nepaul, with oblong or obovate lance-shaped leaves 1–8 in. long, narrowed into a stalk. Flowers white, ⅓ in. across, in clusters along the slender shoots. Fruits in graceful, drooping clusters, dark brown or black.

There is a variety called *floribunda* which differs but little if at all from the type, and another called *obtusa*, in which the leaves are blunt instead of pointed.

Culture &c. as above.

C. buxifolia.—An evergreen species, native of the Nilghiri Mts., 8–10 ft. high, with drooping branches. Leaves elliptic-acute or ovate, like those of the common Box (*Buxus sempervirens*) in shape. Flowers in April and May, white, 2–6 in a short cyme.

Culture &c. as above. This is a very free-growing species, and attains large proportions.

C. frigida. — An almost evergreen species about 10 ft. high, native of Nepaul. Leaves more or less oblong lance-shaped, acute, 8–5 in. long. Flowers in April and May, white, in woolly cymes, followed by large clusters of bright red fruits about the size of small Peas.

Culture &c. as above. This is one of the most ornamental species, especially when studded with its brilliant fruits.

C. horizontalis. — As a bush in the open this fine species grows only about 2 ft. high, but against a wall it will reach a height of 6 ft. or more. The young branches are covered with a thick brown wool, but the leaves—about ⅓ in. long—are smooth, shining green, and are set very close together, bright red or yellow in autumn. Flowers in May and June, small pinkywhite in great profusion, succeeded by round red attractive fruits in autumn and winter.

Culture &c. as above.

C. integerrima (*C. vulgaris; Mespilus Cotoneaster*).—A shrub 3–5 ft. high, native of Carnarvonshire, Europe and W. Asia. Leaves broadly elliptic-oblong, blunt or acute. Flowers in May and June, white or reddish. Fruit round, red, drooping. In the variety *melanocarpa* the fruits are black.

Culture &c. as above.

C. laxiflora.—A Siberian species with oblong blunt leaves, smooth above, woolly beneath. Flowers pinky white in long drooping clusters. This species is closely related to *C. integerrima.*

Culture &c. as above.

C. microphylla. — A pretty trailing evergreen 3–4 ft. high, native of Nepaul. Leaves about ½ in. long, ovate or obovate, acute or blunt, deep glossy green. Flowers in April and May, ½ in. across, white, in great profusion, followed by small deep red berries, which look particularly cheerful in winter. The variety *glacialis* (or *congesta*) is a dwarf alpine form, with smaller pinky flowers, and paler green leaves, glaucous and smoothish beneath.

Culture &c. as above. This species may be grown as a bush in most parts of the kingdom, but in bleak northern parts it is best with the shelter of a wall.

C. multiflora (*C. reflexa*).—A graceful shrub 6 ft. or more high, with slender, drooping branches, native of Persia, N.E. India &c. Leaves deciduous, 1–2 in. long, smooth above, woolly or silky beneath when young. Flowers white, 8–10 in a cyme. Fruits pear-shaped, beautiful carmine-red.

Culture &c. as above.

C. Nummularia.—A distinct and pretty almost evergreen shrub, 10–15 ft. high, native of Kashmir, Western Tibet &c. Leaves roundish, apiculate. Flowers in April and May, white, in woolly cymes. Fruit small, round, black.

Culture &c. as above.

C. pannosa. — A free and elegant Chinese evergreen, with ovate leaves about ¾ in. long, covered with a thick wool, white at first, changing to brown. Flowers white, with a very woolly calyx. Fruits pear-shaped, dull red, about ¼ in. long.

Culture &c. as above.

C. rotundifolia. — A beautiful Himalayan shrub 4–5 ft. high, with roundish, dark green, glossy leaves, about ½ in. long, abruptly pointed, hairy. Flowers solitary, white. Fruits bright scarlet, lasting well into spring. The variety *prostrata* has a more drooping or trailing habit.

Culture &c. as above.

C. sikkimensis.—A deciduous shrub, native of the Sikkim Himalayas. It has large elliptic leaves 4–5 in. long, dull green above, and grey-green beneath. The white flowers are produced in compound umbels in spring, and are succeeded by bright coral-red fruits in autumn.

Culture &c. as above. This and *C. frigida* are remarkable for having the largest leaves in the genus.

C. Simonsi.—Perhaps one of the best species grown. It is a native of the Khasia hills, and grows 8–12 ft. high. Leaves about 1 in. long, rhomboid-roundish, glossy green above, silky beneath. Flowers in April, solitary or twin, almost stalkless. Fruit bright scarlet-red.

Culture &c. as above. This species is largely used as a stock upon which others are grafted.

C. thymifolia.—A pretty evergreen, less than 1 ft. high, native of the temperate Himalayas, with crowded branches, small oblong-ovate, dark, shining green leaves, pinkish flowers in April, and scarlet fruits in autumn and winter.

Culture &c. as above. This species is closely related to and sometimes confused with *C. microphylla.*

C. tomentosa.—A native of Central and S. Europe, with bluntly elliptic leaves ½–2 in. long, woolly. Flowers white, 4–5 in a cluster with a very woolly calyx. Fruits red.

Culture &c. as above.

PHOTINIA.—A genus containing 20 species of smooth or downy, evergreen trees or shrubs. Leaves alternate, leathery, simple, entire or serrate. Flowers in terminal corymbs or panicles. Calyx-lobes 5, ovate blunt. Petals 5. Stamens up to 20. Fruit a drupe or ovoid berry.

Culture and Propagation.—Photinias like a somewhat light loamy soil, and are worth growing chiefly on account of their bold and beautiful foliage. Trained against sunny walls the plants do well, but in bleak parts of the country they may require a little protection in winter. They may be increased by cuttings of the side shoots 2–8 in. long, in sandy soil, under a glass during the summer months. They may also be grafted close to the ground in March and April, on the Quince stock. See article on Grafting, p. 52.

P. arbutifolia (*Cratægus arbutifolia*). *Californian Maybush.*—A Californian tree 10–20 ft. high, with young branches and leaf stalks bright red. Leaves oblong lance-shaped acute, serrated. Flowers in summer, white, in long panicles.
Culture &c. as above.

P. elliptica. — A native of Nepaul, 30 ft. high. Leaves elliptic, toothed, downy beneath. Flowers white, in clusters covered with a rusty down. Fruit yellow, downy.
Culture &c. as above.

P. japonica (*Eriobotrya japonica*).—*Japan Medlar* or *Quince; Loquat.*—A handsome Japanese tree 10–20 ft. high. Leaves large, oblong, wrinkled, downy beneath. Flowers late in autumn, white, in drooping racemes. Fruit about the size of a Pippin Apple, pale orange-red, downy, in large clusters; scarcely ever produced out of doors in the British Islands.
Culture &c. as above.

P. serrulata (*Cratægus glabra*).—*Chinese Hawthorn.*—A handsome Chinese and Japanese tree 10–20 ft. high. Leaves Laurel-like, leathery, oblong acute, serrulate. Flowers from April to July, white, small, in flat corymbs.
Culture &c. as above.

POURTHIÆA.—A genus of evergreen or deciduous shrubs closely resembling the Photinias and almost identical with them in structure. The leaves are usually more or less lance-shaped and serrate with bristly stipules, and the flowers are borne in cymes or corymbs. Calyx sharply 5-toothed. Petals 5, twisted in bud, with an emarginate or lacerated apex. Stamens 20. Fruits about the size of a Pea, fleshy.

P. arguta (*Photinia arguta*). — A handsome shrub native of the Khasia Hills, with downy young shoots, and lance-shaped or elliptic oblong sharply serrate leaves 3–6 in. long. Flowers in summer, white.

Culture and Propagation. — This seems to be the only species at present cultivated, and even it is not well-known. There are about a dozen species altogether known, and they resemble each other a good deal in appearance. The leaves, however, are much narrower and shorter in some than in others. The plants flourish in light sandy loam, and are more valuable for their foliage than anything else. They may be trained against walls like the Photinias, and may also be increased by cuttings of the more or less ripened shoots in summer and autumn inserted under handlights.

RHAPHIOLEPIS (JAPANESE HAWTHORN).—A genus with a few species of rather smooth evergreen trees and shrubs, with alternate simple leathery leaves, entire or serrulate. Flowers in panicles or corymbs. Calyx lobes 5, deciduous. Petals 5, clawed, oblong, acute. Stamens many, deciduous. Berry pulpy.
Culture and Propagation.—These like a rich loam, peat, and sandy soil in warm situations, protected from the north and east. Cuttings of the half-ripened shoots will root in sandy soil under a glass during the summer months.

R. ovata (*R. japonica integerrima*). A beautiful Japanese shrub 2–4 ft. high. Leaves 2–3 in. long, broadly obovate, dark green and shining above. Flowers in June, less than 1 in. across, snowy white, fragrant.

R. indica, the *East Indian Hawthorn*, and its variety *salicifolia*, are also beautiful plants, but not quite hardy enough for our climate, except perhaps on sunny walls in mild places in the south and west.
Culture &c. as above.

STRANVÆSIA. — A genus with only one species, here described with the generic characters:—

S. glaucescens.—An ornamental evergreen tree, about 20 ft. high when fully grown, native of the Khasia Hills and other parts of the temperate Himalayas. It has alternate stalked, simple leathery leaves, ovate lance-shaped in outline with serrulate edges, and bristly stipules at the base. The white flowers appear in June in axillary and terminal clusters, and in a wild state are succeeded by small orange-coloured fruits. The bell-shaped calyx has 5 short erect blunt lobes. Petals 5, spreading, hairy at the base. Stamens about 20. Ovary hairy, half-superior, 5-celled. Styles 5, united at the base.

Culture and Propagation.—This tree is scarcely hardy enough for growing in the open air in the northern parts of the kingdom. It may be planted against a south wall in milder parts, or even grown as a bush in the most favourable localities of the south of England and Ireland. A good well-drained garden soil or sandy loam will suit it well. It may be increased by cuttings of the half-ripened shoots inserted in sandy soil under a handlight in summer; or it may be grafted in March and April upon stocks of the common Hawthorn or upon *Cratægus coccinea.*

AMELANCHIER (June Berry).—This genus contains 4 species of pretty shrubs or bushes, with alternate, stalked, simple, deciduous, entire or serrate, often woolly leaves. Flowers in racemes. Calyx lobes 5, recurved, persistent. Petals 5. Stamens many. Berry small.

Culture and Propagation.—Amelanchiers thrive in a rich loamy soil, and may be propagated in the same way as the Cotoneasters (p. 410) by sowing seeds out of doors or in cold frames as soon as ripe; by cuttings of the half-ripened shoots inserted in sandy soil under a handlight in summer; by layering the shoots in autumn; or by grafting on the common *A. vulgaris* about March.

A. alnifolia.—A pretty N.W. American shrub, about 8 ft. high. Leaves variable, sometimes entire, sometimes serrate. Flowers in spring, white, in compact racemes, succeeded by brilliant purple berries.

Culture &c. as above.

A. canadensis (*Pyrus Botryapium*).—*Grape Pear.*—A very handsome Canadian shrub 6–8 ft. or more high. Leaves oblong elliptic, tailed, hairy when young, and assuming rich mellow tints in autumn, the under surface being of a deep reddish or brownish purple colour. Flowers in April, snowy white, in great profusion. Fruits purple-crimson. There are several varieties, of which *florida*, *ovalis*, *parvifolia*, *rotundifolia*, *oblongifolia* are more or less easily recognised by their foliage.

Culture &c. Bullfinches are very fond of the flower buds.

A. oligocarpa.—A bushy shrub 2–4 ft. high, native of the Eastern United States. It has smooth oblong acute leaves with crenulate edges, and produces its white flowers, each about ¾ in. across, in April and May, either solitary or in pairs, but rarely three or four in a raceme.

Culture &c. as above.

A. sanguinea.—This differs from *A. canadensis* chiefly in having shorter racemes of flowers, oblong serrate leaves, and blackish-purple fruits. In the 'Kew Handlist' it is given as a synonym of *A. canadensis.*

Culture &c. as above.

A. vulgaris (*Mespilus Amelanchier*). This pretty European shrub, 3–9 ft. high or more, has been cultivated for about 300 years. Leaves roundish-oval, downy beneath, when young. Flowers in April, white. Fruits dark purple.

Culture &c. as above.

OSTEOMELES.—A small genus of trees and shrubs having alternate stalked leathery leaves, usually simple and evergreen, but compound in the species described below. Flowers few or numerous, borne in corymbose clusters. Calyx more or less bell-shaped, adnate to the carpels, and having 5 lance- or awl-shaped persistent lobes. Petals 5, oblong spreading. Stamens 10 or more. Carpels 5. Drupe fleshy.

O. anthyllidifolia.—A remarkable and interesting Chinese evergreen shrub about 5 ft. high, with slightly twisted and gracefully inflected branches of a violet-brown colour, and downy in a young state. The oddly pinnate leaves consist of 10 or 11 pairs of small opposite or alternate oval-pointed leaflets, which are very downy on both sides. From 10–25 long-stalked pure white Hawthorn-like flowers are borne in a loose corymbose cluster at the ends of the young shoots, and are succeeded by small Cotoneaster-like fruits, which change from green to violet-red, and then black, with a hoary bloom when fully ripe.

Culture and Propagation.—This is a comparatively new introduction to cultivation, and is too tender for growing in the open air, except in the very mildest parts of the country and in sheltered spots. It flourishes in a mixture of sandy loam and peat, and may be increased by seeds—if obtainable—which should be sown as soon as ripe in cold frames or greenhouses. They will probably take a long time to germinate, perhaps 12 months. Cuttings of the half-ripened shoots will root in a mixture of sandy loam and peat in July and August if placed under a handlight and kept shaded and close for a time. The rooted cuttings may be potted up in spring. Grafting has also been practised, and excellent results have been obtained in Paris by using *Cotoneaster acuminata* as a stock.

XL. SAXIFRAGEÆ—Rockfoil Order

An order containing over 500 species of herbs, shrubs, or trees, very variable in habit. Flowers hermaphrodite, rarely 1-sexed, or polygamous-diœcious. Calyx 5-(rarely 4–12-)parted, free or adnate to the ovary. Petals usually 4 or 5, rarely none, generally perigynous, often small. Stamens usually 4 or 5, or 8 or 10, rarely more, perigynous or epigynous, sometimes hypogynous, filaments free, anthers very often didymous (united in pairs). Ovary inferior or superior, usually consisting of 2 carpels cohering more or less by their face, but distinct and diverging at the apex. Fruit usually a capsule or berry.

This order and the preceding one (Rosaceæ) are very closely related to each other, and it is sometimes difficult to decide whether a plant belongs to one or the other. When in doubt a reference to the 2 united and divergent carpels and to the fewer stamens in Saxifrageæ will usually settle the point.

Tribe I. SAXIFRAGEÆ.—Herbs, often scapigerous. Leaves usually alternate, without stipules. Flowers nearly always pentamerous (with the parts in fives). Ovary 1-3-celled.

ASTILBE.—A genus with 6 species of tall, smooth or hairy perennials, with the habit of *Spiræa Aruncus* (see p. 364). Leaves twice or thrice ternate, and more or less divided, with deeply serrated lobes, and stalks dilated at the base. Flowers often polygamous-diœcious, in terminal racemes or spikes. Calyx lobes 5, rarely 4. Petals 4, 5, or none, inserted at the base of the calyx. Stamens 8 or 10, inserted with the linear petals. Carpels 2-3 scarcely united at the base.

Culture and Propagation.—The Astilbes are graceful feathery plants suitable for the mixed border. They thrive in any good garden soil and like plenty of water during active growth. They are easily increased by dividing the rootstocks early in spring.

A. chinensis.—A graceful Chinese species resembling *A. japonica* in appearance. It has however much taller and stronger flower stems, more loosely branched, and the rose-coloured flowers are larger and very effective right through the summer months up to September.

Culture &c. as above.

A. japonica (*Spiræa japonica; S. barbata; Hoteia japonica*).—A well-known graceful Japanese plant 1–2 ft. high, with thrice ternate or pinnate leaves, and coarsely serrated leaflets. Flowers in early summer, small, pure white, in erect, pyramidal trusses. There is a variegated form but seldom seen.

Culture and Propagation.—This species is usually grown in pots and sold in thousands every spring as *Spiræa japonica*, a name properly belonging to a Rosaceous shrub described at p. 367. The plants are perfectly hardy in the border, but the soil should be rich and well-manured to develop them. Imported clumps may always be obtained about September. Grown in shaded or partially shaded parts of the border or rockery the plants retain their graceful beauty for a long time. After flowering the clumps may be divided and well watered into their new positions.

A. Lemoinei.—This is the name given to a French hybrid between *A. Thunbergi* and *Spiræa astilboides floribunda* (p. 364). If the parentage be correct it proves that plants belonging to two natural orders—Rosaceæ and Saxifrageæ—may be crossed with each other—a very remarkable thing and probably unique.

Culture &c. as above.

A. rivularis.—A vigorous handsome Nepalese perennial 3-4 ft. high. Leaves twice ternate, with ovate doubly serrate leaflets hairy beneath. Flowers late in summer, yellowish-white, in upright clusters.

Culture &c. as above. This is a grand plant for the sides of ponds, streams &c. or in damp parts of the flower border. It is easily increased by dividing the roots in spring when growth is commencing.

A. rubra.—A somewhat rare and pretty Indian species 4–6 ft. high, with twice ternate leaves; leaflets obliquely cordate pointed, 1–2 in. long, serrated. Flowers in summer and autumn, rosy, in dense panicles.

Culture &c. as above.

A. Thunbergi.—A pretty little Japanese undershrub about 1½ ft. high. Leaves oddly pinnate or twice pinnate, with broad, yellowish-green, sharply toothed leaflets. Flowers in May, small, white, in erect, dense, pyramidal clusters, with reddish and rather downy stalks.

Culture &c. as above.

RODGERSIA (RODGERS'S BRONZE LEAF).—A genus with only one cultivated species, described below with the generic characters:—

R. podophylla (*R. japonica*).—A charming herbaceous Japanese perennial with a thick, scaly rootstock and large alternate leaves; lower ones long-stalked, palmately or peltately 5-cleft, 1 to 3 ft. across; upper ones 3-lobed, with sessile, sharply serrated segments, cut at the apex; leaf-stalks dilated at the base, with papery adnate stipules. Flowers in June and July, yellowish-white, in scorpioid cymes disposed in large panicles.

Culture and Propagation.—This plant thrives in a peaty soil and a rather shaded situation. A mulching or top-dressing of well-rotted manure over the crowns after the leaves have withered away will be of great benefit every year. It may be increased by cutting up the rootstock in early spring, but the plants should not be disturbed unless they have become too large.

Other species of Rodgersia have been discovered of late years, and may soon be introduced to cultivation from their habitats in China. *R. æsculifolia*, with yellowish-white flowers; *R. Henrici*, with deep purple flowers; and *R. pinnata*, with pale rose or white flowers, are the species referred to.

SAXIFRAGA (ROCKFOIL; BREAKSTONE).—A genus with about 160 species of beautiful, mostly perennial rock plants, very smooth, hairy or glandular, erect or decumbent. Leaves various; the lower ones often in rosettes; the upper ones usually alternate, sheathing at the base. Flowers usually in panicles or corymbs, white or yellow, rarely purple or pink. Calyx lobes 5. Petals 5, usually equal, sometimes fringed or glandular at the base, perigynous or nearly hypogynous. Stamens 10, rarely 5. Ovary superior or half inferior, 2-lobed at the apex, very rarely with 2 free carpels. Capsule 2-beaked.

Culture and Propagation.—The Rockfoils are beautiful garden plants, chiefly natives of the north temperate or arctic regions, and are very easily grown in ordinary soil with stone and rocks abounding. The plants are easily increased by division in spring, or from seeds sown in cold frames as soon as ripe, while many kinds with creeping or trailing stems are also readily increased by cuttings of the shoots inserted in sandy moist soil in spring in cold frames. With a few exceptions, which have been noted in the proper places, most of the species like rather higher ground than the ordinary level, and are thus eminently suitable for the rock garden in raised positions, where they will not run the risk of having stagnant moisture at the roots. During the active period of growth however they like an abundance of water, and as they gradually begin to pass from this stage, and to ripen their seeds, drier conditions are necessary. Besides the kinds described below there are many forms which are probably hybrids, and they resemble one another so closely that it is practically impossible to distinguish them by mere written descriptions, although they appear distinct enough to the eye.

As there are so many sections of Saxifraga recognised by botanists it may be as well to give them in a tabulated form, showing the species belonging to each section.

1. *Cymbalaria.*—Usually annual or biennial herbs with fleshy, stalked, 5–9-lobed leaves. Petals more or less obovate oblong, yellow or orange.

S. Cymbalaria *S. huetiana*

2. *Tridactylites.*—Herbs with rosettes of fleshy, wedge-shaped 3–5–7-lobed or entire leaves, narrowed into a petiole. Petals white, obovate, wedge-shaped, emarginate.

S. adscendens
S. petræa
S. tridactylites

3. *Nephrophyllum.* — Stems slender, annual or biennial, rarely perennial, usually solitary, erect, leafy. Radical leaves stalked, kidney-shaped, lobed. Flowers few, often large, white. Petals obovate, wedge-shaped, or narrowed into a claw. Calyx tube short, sepals united at the base.

S. atlantica
S. biternata
S. Boissieri
S. granulata
S. irrigua
S. lactea
S. latepetiolata

4. *Peltiphyllum.* — This section contains only one species—*S. peltata*—described below.

5. *Miscopetalum.* — Stems leafy, stolons none. Leaves alternate, roundish and thickish, more or less slightly lobed or crenate. Flowers in panicles, white, spotted, with oblong petals. Calyx segments almost free. Ovary free. The only species belonging to this section is *S. rotundifolia.*

6. *Hirculus.* — Stems leafy. Leaves various, entire, with curved nerves, and narrowed into a hairy petiole. Flowers yellow, with oblong or rarely obovate petals. Sepals free, erect, or spreading, or reflexed.

There are several species belonging to this section, but only two, *S. diversifolia* and *S. Hirculus*, are described below.

7. *Boraphila.*—Stem almost absent. Radical leaves stalked. Scape paniculate. Calyx tube conical, adhering to the base of ovary. Petals white, yellowish-green, or purplish, broadly or narrowly elliptic or lance-shaped, rarely obovate.

S. Clusi
S. hieracifolia
S. integrifolia
S. leucanthemifolia
S. mertensiana
S. nivalis
S. pallida
S. pennsylvanica
S. virginiensis

8. *Hydatica.*—Stems erect, scape-like. Leaves leathery, rarely flaccid, roundish or wedge-shaped, in rosettes on the sterile stems. Calyx lobes and ovary nearly free. Petals white, sometimes unequal, 3 being smaller than the other two.

S. cortusæfolia
S. cuscutæformis
S. Fortunei
S. sarmentosa

9. *Dactyloides.*—Stems usually decumbent, spreading or compact. Leaves persistent, often 3–5-cleft, or pedately or palmately cut. Flower stems often leafy. Flowers solitary or corymbose, white or straw-yellow. Calyx tube rather long.

S. ajugæfolia
S. androsacea
S. aphylla
S. aquatica
S. Camposi
S. conifera
S. cuneata
S. exarata
S. geranioides
S. globulifera
S. hypnoides
S. mixta
S. muscoides
S. pentadactylis
S. trifurcata

10. *Trachyphyllum.* — Leaves fleshy or leathery, stiff, entire, beset with spiny or bristly hairs. Flowers in cymose racemes or panicles. Petals oblong or more or less roundish obovate, sometimes absent.

S. aizoides
S. aspera
S. bronchialis
S. flagellaris
S. tenella

11. *Robertsonia.* — Stems perennial, woody, with a rosette of leaves at the apex. Leaves roundish or obovate, crenate or serrate, with slightly cartilaginous margins, heart-shaped or wedge-shaped at the base, and ending in a flat or half-round stalk. Flowers in panicles, white, spotted with yellow or purple; petals more or less obovate oblong.

S. cuneifolia
S. Geum
S. umbrosa

12. *Aizoonia.*—More or less erect, often tufted herbs. Leaves in rosettes, perennial, very leathery, with cartilaginous margins, pitted, often porous at the apex. Flowers in panicles or corymbs, white, sometimes spotted with purple; or yellow, rarely red. Petals obovate or wedge-shaped, rarely lance-shaped.

S. Aizoon
S. Cotyledon
S. crustata
S. florulenta
S. Hosti
S. lingulata
S. longifolia
S. mutata

13. *Kabschia.* — Stems perennial, clothed with densely imbricating leaves. Lower leaves thickish or fleshy, tongue-shaped or obovate spoon-shaped, pitted at the margin. Flowers in cymose racemes or panicles, white or sometimes yellow, rarely purple. Petals more or less roundish or wedge-shaped.

S. apiculata
S. aretioides
S. burseriana
S. cæsia
S. diapensioides
S. imbricata
S. juniperifolia
S. Kotschyi
S. luteo-viridis
S. marginata
S. media
S. pseudo-sancta
S. rocheliana
S. sancta

S. scardica *S. valdensis*
S. Tombeanensis

14. *Porphyreon; Muscoideæ.*—Leaves imbricated, small, opposite, very often porous at the apex. Flowers solitary, red, or purple. Petals oblong wedge-shaped, or lanceolate.

S. biflora *S. oppositifolia*
S. macropetala *S. retusa*

15. *Bergenia.*—Rootstock thick, leaves large, with stalks dilated at the base. Petals white, red, or purple. Includes MEGASEA which is kept up as a distinct genus by some authorities.

S. cordifolia *S. purpurascens*
S. crassifolia *S. Stracheyi*
S. ligulata

S. adscendens.—A European and N. American annual 3 in. high. Leaves fleshy, 3-lobed; lower ones cordate with cut lobes. Flowers in April, white, with hairy stalks and calyx. *S. petræa* and *S. tridactylites* are very closely related.

Culture and Propagation. — This species is little more than a botanical curiosity. It will flourish in cool damp parts of the rockery facing north or east, and may be increased by seeds sown as soon as ripe or in spring in the open air.

S. aizoides.—A British and European alpine with decumbent, tufted, much-branched stems, 3–8 in. long. Leaves linear oblong, crowded below, scattered upwards, ½–2 in. long; lower ones reflexed, often ciliated. Flowers in summer, ½ in. across, orange or golden yellow, with red dots.

Culture &c. as for *S. flagellaris*, p. 420.

S. Aizoon (*S. intacta*). — Native of Europe and N. America, 5–10 in. high. Lower leaves clustered, silvery, persistent, thick, spoon-shaped, with white, cartilaginous, toothed edges. Flowers in June, creamy-white, often spotted at the base; petals obovate; scape downy, clammy. There are very many varieties of this species, among the best being *carinthiaca* (or *gracilis*), *robusta*, *recta*.

Culture and Propagation. — A good rock plant; it likes plenty of sun, and may be planted so as to face outwards more or less vertically from the face of the rocks, which may be either limestone or granite. The soil however should be deep and rich, so that the roots may penetrate after the moisture between the fissures. Increased by seeds and division.

S. ajugæfolia.—A pretty little tufted species from the Pyrenees. It has small and rather thick fleshy bright green leaves, and 1–3 white flowers with yellow anthers on a stalk, produced in July.

Culture &c. as above. This species luxuriates in a moist but well-drained situation, and is an excellent plant for carpeting the rockery in positions facing north or east, or for making edgings to beds or shrubberies in the shade.

S. Andrewsi.—A hybrid between *S. Geum* and *S. Aizoon*, about 6–12 in. high. Leaves long, spoon-shaped, obtuse, smooth, rather thick, narrowed at the base into a slightly fringed stalk, and having a membranous margin. Flowers in early summer, white, dotted with purple. *S. guthrieana* is very similar to this.

Culture &c. as above for *S. Aizoon.*

S. androsacea. — A mossy species found on damp rocks on the higher Alps. The small deep green shining leaves are spoon-shaped or obovate wedge-shaped, with an entire or 3–5-toothed apex. Flowers 1–3 on a stem, pure white, produced in June and July.

Culture &c. as above for *S. ajugæfolia.*

S. aphylla.—A mossy Alpine species with rosettes of entire or 3–5-toothed fleshy, bright green leaves. The bright golden-yellow flowers appear in June and July, and are usually borne singly on the top of the stalk, but there are occasionally two blossoms on one stem.

Culture &c. as above for *S. ajugæfolia.*

S. apiculata. — A charming mossy Saxifrage supposed to be a hybrid between *S. aretioides* and *S. scardica.* It has dense rosettes or tufts of small thick linear acute leaves, and produces 6–9 flowers of a soft pale primrose-yellow colour on very hairy yellow-green stalks 3–5 in. high from February to April.

Culture &c. as for *S. burseriana.* It makes a charming pot plant, and also fine carpets in the rock garden. It is better than *S. sancta* for this purpose, but does not flower so freely.

S. aquatica.—A beautiful Pyrenean species with fleshy and slightly hairy deeply 3-lobed leaves dilated at the base. The large white or rarely yellow flowers appear in July and August on stalks 12–18 in. high, and their beauty is enhanced by the purple-coloured anthers in the centre.

Culture &c. as above for *S. ajugæfolia.* This species grows naturally in moist and cool places, and may be given similar situations in the rockery. It must, however, be fully exposed to the air.

S. aretioides. — A tiny Pyrenean species about 2 in. high. Leaves crowded, linear strap-shaped, upright, tipped with a sharp point, margins fringed. Flowers from May to July, golden-yellow, on stalks covered with clammy down. There are several varieties, among which may be noted *alba*, with whitish flowers; *præcox*, which flowers earlier than the type; and *primulina*, with soft primrose-yellow blossoms.

Culture &c. as above for *S. burseriana.*

S. aspera.—A more or less tufted species from the Alps and Pyrenees closely related to *S. tenella.* It has rosettes of small lance-shaped linear leaves ending in a sharp point, with ciliated margins, and of a whitish shining green. The yellowish-white flowers with a deeper yellow base and golden-yellow anthers appear in June and July. There are several forms of this species.

Culture &c. as for *S. flagellaris*, p. 420.

S. atlantica. — A compact dwarf-growing Rockfoil, native of the moist rocks of Southern Spain and Algeria. The light green roundish leaves have lobed or crenate edges, and the large white sweet-scented flowers, 3–7 on a slender stem, appear in April and May.

Culture &c. as for *S. granulata*, p. 421.

S. biflora.—A pretty and very variable species of the *oppositifolia* group, native of the high mountains of Central Europe. The lower leaves of the trailing branched stems are obovate roundish, while the upper ones are more spoon-shaped, and all are small, thick and fleshy, bright green or purplish. Nothwithstanding the specific name, more than two flowers are often borne on the stems. They appear in June and July, and vary in colour from deep violet to dark blue, and are occasionally reddish or white.

Culture &c. as for *S. oppositifolia*, p. 424.

S. biternata.—A hairy tufted species, native of the Spanish mountains, with long-stalked, twice ternate, bright green leaves, the lobes of which are more or less deeply divided and bluntly toothed. The white flowers, with spoon-shaped shallow notched petals, appear about July.

Culture &c. as for *S. granulata* below.

S. Boydi.—A charming Saxifrage said to be a hybrid between the yellow-flowered *S. aretioides* and the milky-white *S. burseriana.* The rosettes or tufts of leaves more nearly resemble those of the latter parent, but are linear and end abruptly in a point. The flowers are about ¾ in. across, and appear from March to June. They are soft primrose-yellow in colour, and 1–3, rarely more, are borne on the stems. The white-flowered variety *alba* is very similar in appearance, but shows more of the *burseriana* blood.

Culture &c. as for *S. burseriana.*

S. bronchialis.—A native of Northern Asia and N. America about 6 in. high, with ascending stems, densely leafy at the base. Leaves stiffish, linear lance-shaped, with ciliate or somewhat spiny margins and a pointed apex. The yellowish or creamy white flowers with oblong petals appear in May, and are ornamented with numerous orange-red dots. From 8 to 10 blossoms are borne on a more or less hairy stem.

Culture &c. as for *S. flagellaris*, p. 420.

S. burseriana. — A densely tufted, moss-like plant, about 2 in. high, native of the Alps. Leaves in rosettes, triquetrous, smooth, glaucous. Flowers from March to June, usually one on a slender red stem, milky-white, large, and veined with yellow. The variety *major* is a beautiful rock plant with acute fringed leaves in dense rosettes, and large white flowers on stalks about 2 in. high.

Culture &c. as given above under general instructions. This species likes a high and well-drained position in the rockery, and is almost sure to fail if grown in moist, marshy, or ill-drained spots. Once established in suitable positions it makes very fine carpets of green, studded with white flowers.

S. cæsia.—A pretty native of the Alps and Pyrenees forming dense silvery tufts often less than 1 in. high. Leaves linear-oblong, recurved, keeled, margined with white, crustaceous dots. Flowers in early summer, white, about ⅓ in. across, on thread-like stalks about 3 in. high.

Culture &c. as above for *S. burseriana.*

S. cæspitosa. — A densely tufted British species about 3 in. high. Lower leaves wedge-shaped, 3–5-lobed; upper ones undivided. Flowers from June to August, white, bell-shaped, on stalks usually covered with short glandular down.

Culture &c. as for *S. ajugæfolia* above.

S. Camposi (*S. Wallacei*).—A native of Spain, 3–6 in. high, leaves very variable, ¼–½ in. across, 3–5-cleft, with obtuse or acute teeth, or broader and deeply 3–5-lobed. Flowers in early summer, white, about ⅔ in. across.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. Clusi.—A native of the Pyrenees, where it grows in marshy soil, and on the banks of brooks. It has very short stems with rosettes of thin spoon-shaped and linear leaves more or less toothed and hairy. The white flowers, spotted with yellow, appear in June and July.

Culture &c. as above indicated in the general instructions under Saxifraga. This species likes a moist cool part of the rockery.

S. conifera. — A peculiar Saxifrage from the mountainous parts of Spain. It forms dense clusters of small lance-shaped linear leathery leaves, ending in a sharp point, and more or less densely covered with a soft down. The flowers appear in June and July, from 3 to 9 in a panicle.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. cordifolia (*Megasea cordifolia*).—A pretty Siberian species about 1 ft. high. Leaves large, fleshy, roundish heart-shaped, serrated, on long, thick stalks. Flowers from March to May, clear rose, large, in clustered panicles.

The variety *purpurea* has very large thick and leathery leaves, and is a very strong grower. It has large and showy deep purple flowers.

Several more or less distinct and pretty hybrids have been raised between *S. cordifolia* and *S. purpurascens.*

Culture and Propagation. — This species flourishes in ordinary good and well-drained garden soil in open sunny situations. The plants like plenty of water during active growth and during the summer months. Owing to the glossy texture of the foliage, they stand the smoke and dirt of town gardens well, although they are often very much neglected in such places. Increase may be effected by dividing the plants in early autumn or in spring. Seeds may also be sown as soon as ripe, as recommended above in the general instructions under Saxifraga.

S. coriophylla.—A sturdy, ornamental, silvery species, 3 in. high, native of the Alpine regions of N. Albania. Leaves in rosettes, entire, oblong, convex and keeled beneath, with 5–7 pits or depressions on the margin. Flowers in early spring, large, pure white; petals obovate-oblong, with 3 straight veins. Near *S. Rocheliana*, and now considered to be a variety of it.

Culture &c. as above for *S. burseriana.*

S. cortusæfolia.—A stemless Japanese species with roundish heart-shaped or reniform leaves, 2–3 in. wide, 5 or more lobed, bright green, fading to red or reddish-brown in autumn. Flowers in autumn, white, spotless, in panicles 7–8 in. long.

Culture &c. as above indicated in the general instructions under Saxifraga. Warm sunny positions in well-drained gritty loam suit this plant best. In the colder parts of the kingdom a little protection in severe winters may be necessary. Increased by seeds or division.

S. Cotyledon.—A fine silvery European species, 1–2 ft. high. Leaves in large rosettes, flat, fleshy, spoon-shaped, margined with finely pointed teeth. Flowers in early summer, white, in a large elegant pyramidal panicle 6 in. to a yard high. *S. nepalensis* and *S. pyramidalis* are merely strong-growing varieties of this species, and *S. montavoniensis* has white flowers with red calyx and stamens.

Culture &c. as above for *S. Aizoon.* This species will flourish almost anywhere on old walls, ruins &c. in warm sunny positions. The variety *pyramidalis* however is somewhat tender in the colder parts of the kingdom, and requires protection in winter. It makes a beautiful pot plant.

S. crassifolia (*Megasea crassifolia*). A stout Siberian plant with thick, woody roots and large, fleshy, oval or obovate leaves, very blunt, smooth, and serrulated. Flowers from March to May, red, large, in clustered panicles about 9 in. high.

Culture &c. as above for *S. cordifolia.*

S. crustata.—A native of the chalky Alps with rosettes of blunt linear leaves with minutely crenate margins, and having the upper surface coated with a whitish or grey-green limy powder, and washed with rose or purple beneath. The hairy flower stalks carry 3–6 flowers which are usually white but sometimes spotted with purple-red at the base of the obovate petals.

Culture &c. as above for *S. Aizoon.*

S. cuneata.—A loosely tufted species, native of the Spanish mountains, with leathery spoon-shaped or linear-lance-shaped leaves somewhat clammy beneath, and having three large teeth or lobes. The white flowers are borne in loose panicles about July, and have obovate oblong petals.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. cuneifolia.—A tufted species native of the mountains of Central and S. Europe. Leaves obovate wedge-shaped, serrate, rather leathery, deep green above, reddish beneath. The flower stalks are 4–6 in. high, and bear a small panicle of white flowers, with a yellow centre, in May and June.

Culture &c. as above. This species likes a warm moist position among the rocks and stones in the rock garden. There are several varieties of it, the best known being *apennina* with smaller leaves and flowers. The plants are useful for the lower portions of the rock garden, and are readily increased by seeds or division. See also general cultural instructions under Saxifraga, p. 415.

S. cuscutæformis. — A Japanese species 6 in. high. Lower leaves thickish, roundish or ovate, deeply or wavy toothed. Flowers in summer, white, on branched panicles.

Culture &c. as above for *S. cortusæfolia.*

S. Cymbalaria.—A distinct Caucasian annual, with brown-striped, kidney-shaped, crenately lobed leaves. Flowers from early spring to autumn, bright yellow, in dense masses, on numerous weak straggling stalks. *S. Sibthorpi*, from Greece, and also having yellow flowers, is very similar.

Culture &c. as below for *S. huetiana.*

S. diapensioides.—A densely tufted plant 1½ in. high, native of the Alps of Switzerland, Dauphiny, and the Pyrenees. Leaves linear, erect, keeled, with cartilaginous margins, fringed at the base, 1–2 perforated dots at the apex, and packed into dense cylindrical rosettes. Flowers in early summer, white, bell-shaped, 3–5 in a terminal head on leafy stems.

Culture &c. as above for *S. burseriana.*

S. diversifolia.—A Himalayan species, 6–18 in. high. Lower leaves stalked, 1–2 in. long, ovate or heart-shaped, acute; upper one stalkless. Flowers in July, yellow, ½–¾ in. across, obscurely spotted, arranged in loose clusters.

Culture and Propagation. — This species likes damp, cool, and well-drained soil, with plenty of light and air, but not exposed to the scorching midday sun. It may be increased by sowing seeds or by division as recommended above in the general instructions given under Saxifraga.

S. exarata.—A very variable species, native of the mountains of Central Europe, with rosettes of wedge-shaped 3-lobed leaves, and white or yellowish-white, or rarely rose or purple flowers in June and July. The variety *nervosa* has looser rosettes of sparsely hairy clammy leaves, roundish-oblong in outline, and deeply cut into 3–5 narrow linear lobes. The milky-white flowers have obovate petals as in the type.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. flagellaris. — A Caucasian species, 3 in. high, with thread-like runners issuing from beneath the upper whorl of leaves and rooting at the tips. Leaves obovate, spoon-shaped; upper ones rather hairy. Flowers from April to July, yellow, on erect, simple, glandular-downy stems.

Culture and Propagation. — This plant likes a gritty loam and damp shady parts of the rockery. It is easily increased by the runners.

S. florulenta.—A very pretty species, native of the Maritime Alps. The deep green, spoon-shaped leaves, with bristly edges towards the base, are 1–2 in. long, and form rosettes often over 6 in. across. The beautiful rosy-red or lilac flowers are borne on more or less hairy stalks in narrow clusters in early summer.

Culture &c. as above for *S. Aizoon.*

S. Fortunei.—A pretty Japanese species, with the habit of *S. cortusæfolia.* Leaves reniform, heart-shaped, lobed and laciniately toothed. Flowers late in summer, white, in erect panicles; petals very unequal, edges finely toothed.

Culture &c. as above for *S. cortusæfolia.* This plant requires protection in severe winters.

S. geranioides.—A Pyrenean species, 6 in. high. Lower leaves slightly hairy, roundish kidney-shaped palmately 3-cleft, the side lobes 2-cleft, entire or toothed. Flowers in July, white, numerous; petals obovate-oblong, clawed.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. Geum.—A pretty Pyrenean Saxifrage with rosettes or whorls of roundish or kidney-shaped toothed or crenate leaves, hairy above, smooth and often reddish beneath. The small blush-white flowers, dotted with red, appear in May and June, and are borne in erect panicles on stalks about 4–6 in. high.

The variety *dentata* (also known as *S. hirsuta*) has the hairy leaves deeply and prettily toothed, and pale green beneath, and the white flowers, dotted with rose, are borne on rather taller stems. The variety *elegans* has roundish heart-shaped leaves sharply serrate, and covered with hairs. The flowers are yellow spotted with purple. The variety *polita* differs in having smooth shining roundish heart-shaped leaves with crenate edges.

Culture &c. as above for *S. cuneifolia.*

S. globulifera (*S. granatensis*). — A native of the Spanish and Algerian mountains. It makes a turfy carpet of thickish ovate or spoon-shaped, bright green, entire or 3–5-lobed leaves, which assume a purple-red tinge during the winter months. The pure white flowers appear in May and June, 3–6 or more on a hairy stalk. The variety *gibraltarica* differs in having the leaves more deeply divided into narrower lobes.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. granulata (*Fair Maids of France; First of May; Meadow Saxifrage*).—A pretty British and European species, 6–12 in. high. Leaves rather fleshy, kidney-shaped, lobed; lower ones on slender stalks, upper ones sessile, deeper and more sharply cut. Flowers in April and May, white, inclined or drooping, 1 in. across.

There is a double-flowered variety called *flore pleno*, the beautiful white blossoms of which are over an inch across, and sometimes having a stray petal tipped with carmine.

Culture &c. as above. This species likes a moist or boggy situation in the rock garden.

S. hieracifolia.—A European species, 1 ft. high. Leaves ovate oblong, remotely toothed, dilated at the base, smooth above, hairy beneath and on the edges. Flowers in summer, white, in erect branched panicles.

Culture &c. as above for *S. Clusi.*

S. Hirculus.—A distinct and pretty British and European species, 4–8 in. high. Leaves ½–1 in. long, lance-shaped or spathulate, in rosettes. Flowers in August, clear rich yellow, ½–¾ in. across. with orange-red dots on the lower half of each obovate petal. The variety *grandiflora* has flowers quite 1 in. across.

Culture &c. as above for *S. diversifolia.* This species delights in moist or marshy spots in the rockery.

S. Hosti.—A native of S. Europe, 6–12 in. high. Lower leaves strap-shaped, obtuse, fringed; upper ones oblong, crenate-serrate. Flowers in May, white, with a few purple dots above the middle, 5–9 in a corymb. The variety *altissima* has broader leaves with serrate edges, and the white flowers have a greenish base and purple-red spots.

Culture &c. as above for *S. Aizoon.*

S. huetiana. — This pretty species is remarkable for being an annual or biennial and not a perennial. It is a native of moist and marshy spots on the Cilician mountains in Asia Minor, where it grows in the shade. It is closely related to *S. Cymbalaria*, and forms compact tufts 4–6 in. high of bright green slightly lobed roundish leaves. The numerous small bright yellow flowers are freely produced from May to July.

Culture and Propagation. — This species may be raised by sowing seeds when ripe in well-drained soil in cold frames, and keeping the seedlings under glass until mild weather the following spring, when they may be transferred to moist shaded parts of the rockery. The seeds may also be sown in spring in the open air where the plants are to bloom, covering the seed-patches with a hand-light until the seedlings are well above the surface of the soil. But plants raised thus never attain the size and vigour of those raised from autumn-sown seed.

S. Huguenini.—A neat little perennial 1–2 in. high, native of the Swiss Alps. It has a tufted habit, and creeping stems clothed with oblong ciliate-toothed leaves. The solitary white flowers appear in early summer.

Culture &c. as above for *S. burseriana.*

S. hypnoides (*Dovedale Moss; Eve's Cushion*).—A pretty, deep green, mossy species, native of Britain and W. Europe. Leaves wedge-shaped, 3–5-cleft, smooth or more or less fringed with glandular hairs. Flowers from May to July, white, ⅓–1 in. across, on stalks 3–18 in. long. *S. decipiens, affinis, incurvifolia, hirta, gemmifera, platypetala,* and *Sternbergi,* are more or less distinct forms of this very variable species.

Culture &c. as above for *S. ajugæfolia.*

S. imbricata.—A densely tufted Indian species 3 in. high, leaves small, channelled, ovate-oblong, keeled at the apex, hairy toothed on the edges. Flowers in June and July, white, solitary.

Culture &c. as above for *S. burseriana.*

S. integrifolia.—This is a hairy and clammy plant, native of the Rocky Mountains, and resembling *S. hieracifolia* and *S. virginiensis.* The deep green lower leaves are somewhat membranous, ovate oblong, very blunt, entire or slightly sinuate-crenate. The white flowers are borne on an erect naked scape about May and June.

Culture &c. as above for *S. Clusi.*

S. irrigua.—A native of Tauria 6–12 in. high. Lower leaves palmately 5-parted, upper ones 3-cleft, sessile. Flowers in summer, white, large, bell-shaped, in loose panicles.

Culture &c. as above for *S. granulata.*

S. juniperifolia (*S. juniperina*).—A distinct Caucasian species, with sharp pointed, oval-shaped leaves in dense, firm cushions. Flowers in summer, yellow or greenish-yellow, 6–10 on a spike.

Culture &c. as above for *S. burseriana.*

S. Kotschyi.—A pretty bluish-green species, native of Asia Minor, forming densely tufted rosettes ½–¾ in. across, with small, obovate, blunt, apiculate leaves. Flowers in summer, yellow, in cymes at the ends of the short leafy stems. Requires sheltered sunny corners.

Culture &c. as above for *S. burseriana*, p. 418.

S. lactea.—A remarkable Siberian species 4–5 in. high, clothed with glandular down, and having tufts of wedge-shaped leaves cut into 3–5 bluntly oblong lobes, the upper leaves being cut into 3 linear blunt lobes. The white flowers, with obovate wedge-shaped petals, appear in June, and look very pretty against the bright green foliage.

Culture &c. as for *S. granulata*, p. 421.

S. latepetiolata.—A remarkable biennial Saxifrage, native of the Spanish mountains. It has strong branching stems 9–12 in. high, and dense rosettes of glandular hairy kidney-shaped leaves deeply cut into 3–5 coarsely crenate lobes, and having broad petioles. The white flowers, each ½ in. across, are borne in crowded clusters.

Culture &c. as above for *S. huetiana.*

S. leucanthemifolia.—A pretty North American species 5–18 in. high. Leaves oblong wedge-shaped or spathulate, coarsely toothed or cut, tapering into a stalk. Flowers in summer, white, in a spreading corymbose or paniculate cyme; petals unequal, the 3 outer ones with a heart-shaped, dotted base.

Culture &c. as above for *S. Clusi.*

S. ligulata.—A handsome Nepalese plant 1 ft. high. Leaves obovate or rather heart-shaped, wavy, toothed, expanded at the base into a fringed sheath. Flowers from March to May, pale red, almost white, in forked panicles; petals broad, roundish. The variety *ciliata* differs from the type in having smaller leaves hairy on both surfaces, but it is a charming plant for sheltered nooks in the rockery. It may also be grown in cool conservatories, and will flower a week or two earlier as a result of the artificial protection.

The plant called *S. Schmidti* seems to be identical with the ordinary form of *S. ligulata.*

Culture &c. as above for *S. cordifolia.*

S. lingulata.—A native of the Alps 1–1½ ft. high. Leaves linear tongue-shaped, channelled, warty, crenate, glaucous, fringed at the base, recurved at the apex. Flowers from May to July, white, dotted with rose; petals oval, conspicuously 3-nerved. The variety *cochlearis* has spoon-shaped, leathery leaves ½–1 in. long in tufted rosettes, and white flowers on purple-brown, glandular downy stalks.

Culture &c. as above for *S. Aizoon.*

S. longifolia.—A handsome Pyrenean species with linear-oblong, greyish-green leaves 6 in. long, thick, in dense rosettes, sometimes 1 ft. across, with cartilaginous, serrulate edges. Flowers in July, white, slightly dotted with red, in a close pyramidal cluster 1–2 ft. high.

Culture &c. as above for *S. Aizoon.* This species may be planted between stones and does best in a position facing west or south-west.

S. luteo-viridis. — A densely tufted species 4–5 in. high, native of the Transylvanian mountains. Lower leaves more or less spoon-shaped, ciliate at the base. Flowers from June to August, yellowish-green, in cymose panicles.

Culture &c. as for *S. burseriana.*

S. macnabiana.—A beautiful tufted perennial 4–5 inches high, with lance-shaped serrate leaves having a somewhat powdery surface. The flowers are produced freely in May and June on somewhat hairy stalks, and are about three-eighths of an inch across, being rendered particularly attractive by means of the numerous rose or crimson speckles on the lower portion of the pure white roundish petals.

S. macnabiana was raised in the Botanic Gardens, Edinburgh, in 1875, and is believed to be a hybrid between the *pyramidalis* variety of *S. Cotyledon* and either *S. lingulata* or *S. Hosti.*

Culture &c. as above for *S. Cotyledon.*

S. macropetala.—A remarkable Tyrolese species more or less resembling both *S. biflora* and *S. oppositifolia.* The lower leaves are roundish wedge-shaped, the upper ones being somewhat ciliated and pitted. The deep lilac flowers, with broad elliptic petals, appear in April, and are rendered distinct by the pretty red anthers.

Culture &c. as for *S. oppositifolia.*

S. marginata.—A native of S. Europe with purplish stems 2–4 in. high. Leaves in dense rosettes, small, oblong, dotted on the margins with incrustations of lime. Flowers in July, white, ½ in. across, in small rather compact cymes.

Culture &c. as above for *S. burseriana.* This is one of the prettiest of the 'encrusted' Saxifrages.

S. maweana. — A beautiful tufted rock plant, native of Tetuan. Leaves 1–2½ in. long, lower ones in loose rosettes, roundish kidney-shaped, 3-cleft to the middle, or with the side-lobes cleft; upper ones wedge-shaped, 3-cleft. Flowers in May and June, white, ¾ in. across, on erect stalks 4–6 in. long.

Culture &c. as above for *S. ajugæfolia.* Requires a damp shaded place in the rockery.

S. media.—A native of the Pyrenees 6–9 in. high, forming dense compact rosettes on the ground. Lower leaves imbricated, spathulate, strap-shaped, sharp or blunt; upper ones spoon-shaped, smooth except at the apex. Flowers in summer, pink, crimson, or purple, changing to deep blue when old. The variety *Frederici Augusti* has small rosettes of narrow lance-shaped bright green leaves and numerous yellow flowers on short leafy stalks.

Culture &c. as above for *S. burseriana.*

S. mertensiana.—A somewhat downy N. American species with roundish heart-shaped hairy leaves, cut into 3–4 blunt or acute lobes. Flowers in early summer, white, borne on slender erect scapes in loose panicles.

Culture &c. as above for *S. Clusi.*

S. mixta.—A densely tufted hairy Saxifrage, native of the Pyrenees. The more or less obovate wedge-shaped leaves are cut into 3 blunt linear lobes, and are for the most part bright green. The milky-white flowers appear in July and August, and the roundish-obovate petals are sometimes veined with purple. The variety *iratiana* differs in having broadly obovate wedge-shaped leaves cut into 5–9 short and blunt linear lobes, while the white roundish petals have purplish veins.

Culture &c. as above for *S. ajugæfolia.*

S. muscoides. — A pretty Pyrenean species 2–3 in. high, forming a dense green carpet of smooth entire or 3–5-cleft leaves. Flowers in May and June, pale yellowish or purple, 1–10 on a stalk. The variety *atropurpurea* produces a mass of deep red-purple flowers on stalks 1–2 in. high; the variety *pygmæa* and *crocea*, as well as the closely related *S. aromatica*, *S. exarata*, *S. pedemontana* and *S. Rhei*, are all more or less beautiful rock plants.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. mutata.—A Swiss species 6–12 in. high. Leaves flat spoon-shaped, cartilaginously crenated, fringed with long clammy hairs. Flowers in summer, reddish-brown, with deeper coloured dots, and borne in panicles.

Culture &c. as above for *S. Aizoon.*

S. nivalis. — A British species with rather leathery, broadly spoon-shaped, crenate-toothed leaves, reddish beneath, ½ -1 in. wide, stalks 1–2 in. long. Flowers in July and August, white, ¼ in. across, 4 -12 in a capitate cyme 3–6 in. high.

Culture &c. as above for *S. Clusi.*

S. oppositifolia.—A handsome British species with creeping leafy stems 6–8 in. long. Leaves opposite, densely crowded, ovate or obovate, flat, blunt, ciliated. Flowers in April and May, bright purple, ½ in. across, on short annual shoots. There are several varieties, among which the following may be noted: *alba*, white flowers; *major*, with larger flowers than the type; *splendens*, very bright coloured flowers; *pyrenaica superba*, a strong-growing variety with rosy-lilac flowers twice as large as those of the type. Other forms more or less distinct in size and colour are *pyrenaica maxima*, *p. rubra*, and *grandiflora.*

Closely related are *S. rudolphiana* with rosy-purple flowers usually one on a stalk, sometimes two; *S. biflora*, with deep blood-red or bright rose flowers; *S. Kochi*, flowers rosy-purple in twos or fours; and *S. retusa*, leaves short, dense, and firm, flowers purple, in May and June.

Culture and Propagation.—Being a native of the alpine regions of Wales and Scotland, as well as Europe, this species requires to be grown in well-drained gritty soil, composed of sandy loam and pieces of granite or other rock. As hot summers are usually unfavourable to it, the plants should be placed on slopes or banks of the rockery facing north, with plenty of light and air, and during the summer months should receive good supplies of water. When well grown they form dense carpets of green and look very handsome when in bloom. They also make very charming pot plants for a cold greenhouse. Increased by seeds, division, or cuttings of the tips of the non-flowering shoots.

S. pallida.—A pretty little Saxifrage native of the Sikkim Himalayas, where it grows wild at an elevation of 18,000–17,000 ft. It forms flat rosettes of green spoon-shaped leaves, more or less toothed on the margin, and produces its white flowers, ¼–¾ in. across, in spring. It is remarkable for the persistence of the blunt elliptic petals during the ripening of the seed.

Culture &c. as above for *S. Clusi.*

S. peltata (*Umbrella Plant*). — This is probably the largest of the Saxifrages. It is found near streams in California, and has roundish peltate 6–10-lobed leaves 6–18 in. wide, on cylindrical, downy stalks 1–2 ft. long, the lobes being cut and sharply toothed. Flowers in April, white or pale pink, ½ in. across; petals elliptic, blunt.

Culture and Propagation. — This species grows luxuriantly near the edges of ponds, streams &c. where its roots can reach the water; but it also flourishes in moist shady parts of the ordinary flower-border. The remarkable leaves, owing to the depression in the centre where the leaf stalk joins the blade, hold a considerable amount of water after a heavy rain, and during the autumn months they assume rich and effective red and brown tints. The plant may be increased by seeds and division as recommended in the general instructions under Saxifraga.

S. pensylvanica (*Swamp Saxifrage*). A Pennsylvanian species 1–2 ft. high. Leaves clustered, oblanceolate, obscurely toothed, 4-8 in. long, narrowed into short broad stalks. Flowers in May and June, greenish, small, many on an erect, downy, clammy scape.

Culture &c. as above for *S. Clusi.*

S. pentadactylis. — A densely tufted Pyrenean plant 3–6 in. high. Leaves with long compressed stalks, smooth, 5-cleft. Flowers in May and June, white, in loose panicles.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. pseudo-sancta. — A tufted species native of the Balkan Mountains, with hairy stems and erect appressed linear awl-shaped leaves, a little broader and ciliate at the base, and of a bright shining green when young. The citron-yellow flowers appear in spring or early summer.

Culture &c. as above for *S. burseriana.*

S. purpurascens (*Megasea purpurascens*).—A large-leaved handsome Himalayan species 6–12 in. high. Leaves obovate rounded, entire, 2–3 in. long, glossy green, sometimes obscurely sinuated, and margined with red. Flowers from April to June, purple, bell-shaped, about 1 in. across, and borne in dense, downy, glandular, corymbose panicles.

Culture &c. as above for *C. cordifolia*, p. 419.

S. pygmæa (*S. paradoxa*).—A Pyrenean species 1–2 in. high, with slender thread-like stems. Leaves lance-shaped, smooth. Flowers in May and June, yellowish, very small.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. rocheliana. — A pretty Austrian kind with tufts of smooth, tongue-shaped, white-edged leaves, fringed at the base, the upper ones pale green, with clammy hairs. Flowers in spring, white, large, freely produced in corymbose stems 3–4 in. high. *R. coriophylla* is very near this, and is practically a variety of it.

Culture &c. as above for *S. burseriana.*

S. rotundifolia.—A native of Austria, about 1 ft. high. Leaves kidney-shaped, coarsely and unequally toothed, the upper ones stalked. Flowers in May and June, dotted with scarlet; petals lance-shaped, acute, 3-nerved. The variety *taygetea* from Greece has the leaves 5–9-lobed, the lower ones stalked and hairy-edged, the upper ones linear or trifid. Other forms are *angulosa, heucherifolia, lasiophylla*, and *repanda.*

Culture &c. as above for *S. cuneifolia.*

S. Salomoni.—This is a pretty hybrid between *S. rocheliana* and *S. burseriana*, both of which have white flowers. Their offspring has mossy grey-green leaves from which arise purplish scapes 2–3 in. high, each bearing a solitary white flower about ¾ in. across in March and April.

Culture &c. as above for *S. burseriana.*

S. sancta.—A beautiful species, native of Greece, forming a dense carpet-like mass of deep green, lance-shaped, keeled leaves, fringed and finely toothed on the margins. Flowers in early spring and summer, bright yellow, in a short dense spike an inch or two high.

Culture &c. as above for *S. burseriana.*

S. sarmentosa (*Aaron's Beard; Creeping Sailor; Mother of Thousands; Old Man's Beard; Wandering Jew; Pedlar's Basket, &c.*).—The common names of this distinct and pretty Chinese plant show that it is fairly well known. Leaves roundish heart-shaped, hairy, crenate-lobed, red beneath, mottled above; runners creeping, and ending in rooting offsets. Flowers in summer, white, 2 of the inner petals having a yellow spot, and the central one 2 scarlet spots at the base; the 2 outer petals large, flaccid.

The variety *minor* is merely a smaller growing form; *tricolor* is a handsome plant with green leaves beautifully blotched with creamy white and red, but too tender, I fear, for outdoor cultivation, except in shady spots in summer.

This species is usually grown suspended in pots or baskets to allow the runners and offsets to hang down, and is often seen in rooms or cottagers' windows, or in cool conservatories. As an indoor rock plant it is charming. It may also be grown outside in the mildest parts of the British Islands.

Culture &c. as above for *S. Clusi.*

S. scardica. — A pretty Macedonian Saxifrage forming dense and somewhat hairy tufts. The leaves are oblong acute stiffish, becoming lance-shaped acute upwards, of a bright grey-green, tinged with dull purple beneath. The white or pale rosy-red flowers appear in June and July on purple hairy stems in corymbose clusters.

Culture &c. as above for *S. burseriana.*

S. Stracheyi. — A strong-growing species 4–8 in. high, native of the Western Himalayas. Leaves with roundish stipular sheaths at the base, obovate wedge-shaped, 3–6 in. long, lobed at the base, irregularly toothed and fringed on the edges. Flowers in March, pink, ¾–1 in. across, in a much-branched drooping panicle; petals obovate, spoon-shaped, or roundish. The variety *Milesi* has leaves 9–12 in. long, 4–5 broad, and white flowers. *Thysanodes* is somewhat taller, with obovate, deeply crenate-serrate leaves, hairy on both sides, especially beneath; flowers in April, white, small, in a slightly branched raceme. The variety *alba* and the plant called *S. afghanica*, with white flowers, seem to be identical. *S. speciosa* is a pretty hybrid in this section with large rather heart-shaped leaves and large bright pink flowers.

Culture &c. as above for *S. cordifolia.*

S. tenella.—A native of the Alps, with rosettes of linear pointed leaves, fringed on the margins. Flowers in summer white, numerous, in a loose panicle.

Culture &c. as for *S. flagellaris*, p. 420.

S. tombeanensis.—A pretty Alpine Rockfoil, native of the Tyrol, and somewhat resembling *S. burseriana.* It has rosettes of small erect ovate lance-shaped leaves minutely serrulate on the margins, the upper ones becoming much narrower and pointed, and covered with glandular hairs. The bright red hairy stems bear 3-4 white flowers in April and May.

Culture &c. as above for *S. burseriana.*

S. trifurcata (*S. ceratophylla*).—A showy and strong-growing species, native of Spain, with dark green, deeply 2-3-parted leaves, forming compact, wide-spreading tufts, 3-8 in. high; segments awl-shaped, horny-pointed; stems reddish at the base, clammy. Flowers in early summer, pure white, in loose branched panicles.

Culture &c. as above for *S. ajugæfolia*, p. 417.

S. umbrosa (*London Pride; St. Patrick's Cabbage*).—A beautiful and well-known garden plant, native of the Kerry mountains round Killarney, and the Spanish Peninsula. Leaves in loose rosettes, roundish or broadly ovate, coarsely toothed or crenate, ½-2 in. wide, stalked. Flowers in summer, white, ¼ in. across, dotted with red, in panicled cymes 6-12 in. high. *S. Geum* (and its forms *elegans* and *gracilis*), *S. hirsuta*, are varieties or sub-species; other forms being *punctata* and *serratifolia.*

Culture &c. as above for *S. cuneifolia.*

S. valdensis.—A native of the S. of France, 3 in. high. Leaves dense, short, flat at the base, but more or less keeled at the apex, irregularly dotted above. Flowers in May and June, white, rather large, corymbose, on short hairy stalks.

Culture &c. as above for *S. burseriana.*

S. virginiensis.—A pretty N. American species 4-9 in. high. Leaves obovate or oval spoon-shaped, thickish, crenate-toothed, narrowed into broad stalks. Flowers from April to June, white, in more or less clustered cymes. The variety *flore pleno* has compact double flowers. *S. elongata* is closely related but has more slender flower stems.

Culture &c. as above for *S. Clusi.*

TIARELLA (FOAM FLOWER).—A genus with 5 species of erect slender perennial herbs. Leaves usually radical, long-stalked, simple or 3-foliolate. Stipules small, adnate to the stalks. Racemes terminal. simple or compound. Calyx lobes 5, ovate. Petals 5, entire. Stamens 10. Ovary superior; styles 2, slender.

T. cordifolia (*False Mitrewort*).—A pretty border or rock plant native of N. America. Leaves heart-shaped, sharply lobed and unequally toothed, hairy above, downy beneath, stem sending out runners after flowering. Flowers in April, white, small, starry, in great abundance.

Culture and Propagation.—This species grows well in ordinary soil, and is easily increased by dividing the rootstock in early autumn or spring. It likes a partially shaded situation in the rockery or border.

TELLIMA.—A small genus of more or less hairy perennials with roundish heart-shaped lobed or toothed leaves, and greenish or white flowers in racemes like the Tiarellas. Calyx tube bell-shaped, 5-toothed or lobed. Petals 5, entire, 3-cleft or pinnately divided. Stamens 10. Ovary half-superior; styles 2-3, short.

T. grandiflora.—A hairy perennial 1½-2 ft. high, with lobed and toothed leaves beautifully veined and tinted with bronzy purple like some of the Heucheras. Its greenish-yellow flowers are borne in erect racemes but are not particularly attractive.

Culture and Propagation.—This is the species best known, but there are others somewhat similar such as *T. Cymbalaria* and *T. parviflora* but not so desirable. The plants grow in tufts in any ordinary good soil, and may be increased by division in early autumn or spring.

MITELLA.—A small genus of perennials with long-stalked, heart-shaped lobed or crenate leaves, with membranous stipules adhering to the stalks. Flowers small, greenish, in long slender racemes. Calyx with 5 spreading lobes. Petals 5, 3-cleft or cut into thread-like filaments. Stamens 10 or 5. Ovary superior. Styles 2, short.

Culture and Propagation. — These plants though not remarkable for their flowers nevertheless make handsome tufts in the rock garden, like the Heucheras, Tellimas, and Tiarellas. They flourish in sandy peat and loam and may be increased like their relatives by division in autumn or spring.

M. diphylla.—A pretty N. American rock plant 6–9 in. high with tufts of heart-shaped 3-5-lobed and toothed leaves and whitish-green flowers with finely divided petals, appearing in April and May.

Culture &c. as above.

M. pentandra.—Also a native of N. America, about 6 in. high with heart-shaped bluntly lobed leaves and yellowish-green flowers in May, the petals being divided as in *M. diphylla*, but only 5 stamens present.

Culture &c. as above.

HEUCHERA (Alum Root).—A genus including about 20 species of thick-rooted annual or perennial herbs, often tall, hairy or glandular, with naked or few-leaved scapes. Lower leaves long-stalked, broadly heart-shaped or roundish, lobed or crenate. Stipules membranous, adnate to the leaf stalks. Flowers in spiked racemes or panicles. Calyx lobes 5, sometimes unequal. Petals usually 5, small, entire. Stamens 5, inserted with the petals at the mouth of the bell-shaped calyx-tube. Ovary almost inferior, styles 2, elongated.

Culture and Propagation.—The Heucheras thrive in any ordinary garden soil, except stiff clay. They are easily increased by division in autumn, or early in spring. They may also be increased by seeds sown in cold frames as soon as ripe, afterwards pricking the seedlings out into a prepared part of the border the following spring in mild showery weather. They are valuable for the rockery or the edge of the ordinary flower border in well-drained positions.

H. americana.—A N. American species 1½ ft. high, clothed with a clammy down. Leaves 5–7-lobed, toothed. Flowers in summer, reddish.

Culture &c. as above.

H. brizoides is a hybrid with leaves like *H. sanguinea* and masses of soft pink flowers in summer. It is not yet well known but is well worth growing.

Culture &c. as above.

H. cylindrica.—A native of N. America, 1–1½ ft. high. Leaves deeply and roundly lobed, and fringed. Flowers in summer, greenish, rather large.

Culture &c. as above.

H. glabra.—A native of N.W. America 1 ft. high. Leaves sharply lobed, smooth, unequally and sharply toothed. Flowers in summer, white, small.

Culture &c. as above.

H. hispida (*H. Richardsoni*).—A hairy species from the mountains of Virginia and Carolina. Leaves roundish, 5–9-lobed. Flowers from May to July, veined with purple, on stalks 2–4 ft. high.

Culture &c. as above.

H. micrantha. — A N.W. American species 1–2 ft. high. Leaves bluntly lobed, crenate, with horned teeth and beautifully marbled with deep brownish-purple, which gives a very effective appearance in the rockery or border. Flowers in summer, yellowish, in loose panicles.

Culture &c. as above.

H. pubescens (*H. pulverulenta; H. ribifolia*).—A plant about 1 ft. high, native of the United States, covered with a powdery down. Leaves acutely lobed and toothed. Flowers in summer, pale red, large, variegated with yellow.

Culture &c. as above.

H. sanguinea.—A handsome perennial 9–18 in. high, from N. Mexico. Leaves heart-shaped rounded, 5–7-lobed, toothed and ciliated. Flowers from early summer to autumn, bright coral red—or almost scarlet in the beautiful variety *splendens*—more or less drooping on a downy, branched stalk, like small blood-red Lilies of the Valley. The variety *alba* has white flowers, but is not nearly so showy.

Culture &c. as above. This species is far superior as a garden plant to any of the other species, and looks well in either the rockery or border. It flourishes in well-drained ordinary garden mould, and may be easily increased by separating the crowns early in autumn.

H. villosa (*H. caulescens*).—A native of N. America. Leaves sharply 7–9-lobed. Flowers late in summer, violet, small, on rusty-haired scapes 1–3 ft. high.

Culture &c. as above.

TOLMIEA.—A genus closely related to *Heuchera* and differing in having only 3 stamens. The only species described below requires the same treatment as *Heuchera* and *Tiarella*, both of which names it bore at one time.

T. Menziesi. — A native of N.W. America, having stems 1–2 ft. high, with 3–5 hairy leaves, lower ones stalked, incised, lobed. Flowers in April, greenish, rather large, nodding in a slender elongated raceme, calyx purple-nerved.

Culture &c. as above for Heuchera. It flourishes in ordinary well-drained garden soil and may be increased by division or seeds.

PARNASSIA (Grass of Parnassus). A genus with twelve species of elegant, very smooth, scapigerous herbs, with radical, ovate-kidney-shaped or oblong leaves, with stalks dilated at the base. Scapes angled, 1-flowered. Calyx lobes 5. Petals 5, entire or fimbriated. Stamens 5, hypogynous or perigynous, alternating with 5 more or less club-shaped and divided, glandular tipped scales or staminodes. Ovary superior or half inferior. Style 1, very short, with 3–4 stigmas.

Culture and Propagation.—Parnassias thrive in a moist peaty soil in the rockery, or in the bog-garden. They may be increased by division in early autumn, or in spring as growth is about to commence; or from seed sown as soon as ripe in cold frames, afterwards pricking the seedlings out into light soil when large enough.

P. asarifolia. — A very pretty North American plant, 6 in. high, with more or less kidney-shaped leaves and white flowers in summer.

Culture &c. as above.

P. caroliniana.—A native of North American swamps, 6–9 in. high. Leaves roundish below, ovate above. Flowers from July to September, white, netted with green or purple.

Culture &c. as above.

P. fimbriata.—A remarkable plant, 6 in. high, native of N. America. Lower leaves kidney-shaped, hollowed out at the base and lobed or divided. Flowers in July, white, petals obovate, clawed, fringed at the base.

Culture &c. as above.

P. nubicola.—A Himalayan species with elliptic, rather heart-shaped leaves. Flowers in summer, white, solitary, over an inch across, borne on 4-angled stalks 6–12 in. high, and having 3-lobed yellow staminodes.

Culture &c. as above.

P. palustris (*Common Grass of Parnassus*).—A lovely little bog plant, about 6 in. high, native of the British Islands. Leaves heart-shaped rounded. Flowers in summer, ½–1 in. across, white, with greenish pellucid veins.

Culture &c. as above.

P. parviflora.—A native of N. America, 6 in. high, with ovate leaves. Flowers in July and August, white, net-veined with pale purple or green.

Culture &c. as above.

Tribe II. Francoeæ.—Scapigerous herbs with parts of the flowers in fours (tetramerous). Stamens 4 or 8.

FRANCOA (Maiden's Wreath).—A genus with two or three species of Chilian perennials beset with glandular hairs or down, and with thick fleshy rootstocks. Leaves crowded, lyrate-pinnatifid, or pinnate, glandular-toothed, net-veined. Flowers in long, more or less erect or arching racemes. Calyx lobes, petals, and stamens 4. Ovary free, 4-angled or lobed.

Culture and Propagation.—Francoas thrive in a rich, light, loamy soil, but can be grown out of doors (except in summer) only in the very mildest parts of the country, and they should have dry sheltered positions on warm banks or borders. The spikes of flowers, often over 2 ft. long, are excellent for cutting and last a long time. Seeds must be raised in a hotbed or greenhouse, and may be sown in early spring. Afterwards prick out separately into small pots and grow on until large enough for putting out or growing in larger pots. The plants may also be increased by dividing the rootstock in spring or early autumn.

F. appendiculata. — A lyrate-leaved plant 1–2 ft. high. Flowers in July, pale red, with a deeper spot at the base of each petal, in compact racemes on nearly simple scapes.

Culture &c. as above.

F. ramosa.—This species has a stem, and shortly stalked, usually decurrent leaves. Flowers in July and August, white, loosely arranged on a much-branched scape.

Culture &c. as above.

F. sonchifolia.—A species about 2 ft. high, with short-stalked leaves, usually decurrent below the basal lobes. Flowers in summer, purple or pink, often with a darker blotch near the base of the petals.

Culture &c. as above. Increased by seeds or division.

Tribe III. HYDRANGEÆ. Shrubs or trees with opposite, exstipulate, simple leaves. Stamens often epigynous, 8, 10, 12 or more.

HYDRANGEA.—A genus with over 30 species of deciduous or evergreen shrubs or trees with entire serrate or lobed leaves. Flowers in large terminal corymbs, fertile ones small, sterile ones large and without petals. Petals 4 or 5, valvate. Stamens 8–10. Styles 2–4, free or united at the base.

Culture and Propagation. — In the milder parts of the country, and on rich warm, well-manured loam, Hydrangeas grow very well. Cuttings of the young and partially ripened shoots root readily in sandy soil in a shady place in summer or under glass in spring or autumn. Seeds are freely produced by most of the species, and these may be sown in cold frames as soon as ripe. The seedlings will probably not appear till spring, when they may be pricked out into light rich soil in warm shady positions.

North of the Thames Valley Hydrangeas can scarcely be regarded as a great success in the outdoor garden, but in Devonshire and Cornwall and the South of Ireland they attain luxuriant proportions. Positions which are partially shaded from the hot midday sun suit the plants best. A good mulching of well-rotted manure in autumn or winter will be of the greatest benefit to the plants and enable them to produce masses of fine foliage and blossom every season. The bushy species may be pruned in winter, cutting away the old wood, so that young vigorous shoots may appear in spring.

Some people are always trying to turn the white flowers blue by the addition of alum, iron &c. to the soil, and there is a great variation in shade owing no doubt to the chemical composition of the soil in which the plants are grown. Indeed the Hydrangeas of the *Hortensia* type are as variable in the colour of the flowers, although raised from cuttings, as if they were raised from seed.

H. arborescens.—A N. American shrub 4–6 ft. high. Leaves ovate, rather heart-shaped, upper ones lance-shaped, coarsely toothed, pale and rather downy beneath. Flowers in summer, white, small, fragrant, nearly all fertile, in flattish corymbs.

Culture &c. as above. It is not a particularly showy plant owing to the majority of the flowers being fertile or perfect (i.e. having both stamens and pistil). It is, however, interesting as being the first Hydrangea cultivated in British gardens.

H. aspera.—A hardy Chinese shrub resembling *H. paniculata* in habit, and having lance-shaped ovate or almost obovate tapering leaves, with wavy and serrate margins. The upper surface is green, but the under surface is greyish-green, thickly covered with roughish hairs. The cymes of flowers appear in summer, the sterile ones being large and numerous.

Culture &c. as above.

H. chinensis.—A Chinese shrub 2–6 ft. high, with deeply toothed leaves 3–5 in. long, and small clusters of white flowers in summer. It is closely related to *H. virens*, but differs in the leaves being green on both sides and in the sepals of the sterile flowers being equal in size, and thicker, almost fleshy in texture.

Culture &c. as above.

H. hirta.—A compact shrub, native of Japan, 3–4 ft. high, with slender hairy branches, and ovate, serrate, Nettle-like leaves. Flowers in summer, white, numerous, nearly all fertile, and borne in terminal cymes 2–3 in. across. Not a showy species.

Culture &c. as above.

H. Hortensia (*Hortensia opuloides*). A beautiful Chinese shrub 2–5 ft. high, with broadly ovate, pointed, serrated, shining green leaves. Flowers from spring to autumn, white or bluish, in large corymbs or cymes, nearly all sterile, and resembling those of the Guelder Rose (p. 410).

There are numerous fine varieties of this species, the best being:—*japonica*, or *Lindleyi* as it is now called, with white or blue flowers tinged with red and finely toothed; *Belzoni*, flowers white or blue with entire sepals, and *B. variegata*, with white blotched leaves; *Otaksa*, flowers flesh-coloured, handsome; *communis*, flowers deep rosy-pink; *stellata*, all the flowers sterile and double, pink, rose, or pale blue, changing to green with age; *Thomas Hogg*, a magnificent pure white variety, grown largely in pots for market work; *nigra* has pretty dark purple-brown stems; and *tricolor* has the leaves beautifully marbled with white and pale green, and edged with creamy yellow.

The variety *acuminata* has leaves slightly hairy on both surfaces, and bearded in the axils of the veins; the flowers are blue, but vary a good deal according to the nature of the soil in which the plants are grown.

Culture &c. as above.

H. involucrata.—A handsome Japanese shrub 6–10 ft. high with herbaceous stems and very large oval oblong or roundish double-toothed leaves sometimes nearly 12 in. long and 6–9 in. broad, which when young are covered on the under surface with a dense white woolly down. The flowers appear in summer in flat-topped or roundish clusters, and the inflorescence is remarkable for having large leafy bracts at the base where the branches are given off. The typical form has but a few large sterile flowers on the outer edge of the trusses, but in many forms which have been cultivated the sterile flowers are more numerous and vary in colour from rose to lilac, rose-pink, and even yellow, some forms having double flowers.

Culture &c. as above. This species likes warm, moist, and partially shaded situations. It is fairly hardy as far north as the Thames, but is better adapted for outdoor cultivation in mild southern and western parts of the kingdom.

H. paniculata.—This species attains a height of 25 ft. in Japan, its native country, forming a dense round head, and an upright trunk 6 in. in diameter. Leaves opposite or in threes, ovate oblong acute, downy, sometimes 5–6 in. long. Flowers in summer and autumn, pure white, in massive conical or cylindrical clusters 1 ft. long at the end of almost every shoot. There are several forms, the best known being *floribunda*, *grandiflora* and *minor*.

Culture &c. as above. To obtain the best results, this plant should be well pruned in winter, and the soil well manured or mulched at the same period.

H. petiolaris.—A tall climbing or trailing shrub native of the Japanese mountains, where it grows in shady woods on the Cryptomeria (see p. 982), clothing the trunks to a great height, in the same way as the Ivy clambers up trees in this country. It has ovate or elliptic leaves, somewhat heart-shaped at the base, and produces flat corymbs of whitish flowers in June. Only a few of the outer ones are sterile and larger than the others. There are a few forms of this species, such as *scandens*, which has small heart-shaped or ovate leaves with long stalks; and *cordifolia*, which has distinctly heart-shaped leaves and entire or toothed sepals of the sterile flowers, rarely notched.

Culture &c. as above. Owing to its climbing character this species is best grown against a wall, or in the mildest parts of the kingdom it might be trained over or up old tree trunks in the same way as Ivy, or even over large boulders in partially shaded parts of the rock garden. This species is often erroneously called *Schizophragma hydrangeoides* in gardens.

H. pubescens.—A pretty Japanese shrub 4–5 ft. high, with deep green ovate serrate leaves tapering to a point and covered with a whitish down beneath. The leaf stalks and midrib are of a reddish-purple colour and look very pretty. The flowers appear in summer and are borne in a flat cyme with downy branches. Some of the outermost cross-shaped flowers only are showy and sterile, and over an inch across; they are white slightly veined with green, while the smaller fertile flowers have 3 styles.

Culture &c. as above. This species is quite hardy in the milder parts of the kingdom, but attains its finest proportions in the South and West.

H. quercifolia.—A very distinct and ornamental shrub native of Florida, 4–6 ft. high. Leaves large, ovate, about 6 in. long, lobed and toothed like a Plane rather than an Oak leaf, hairy and grey beneath, stalks and stems covered with a rusty down. Flowers in July, white, changing to greenish-purple and borne in flattish corymbs, a few of the outer blossoms being large and sterile.

Culture &c. as above.

H. radiata (*H. nivea*).—A N. American shrub 4–6 ft. high, closely related to *H. arborescens*, from which, however, it may be distinguished by the short dense whitish wool on the under surface of the leaves.

Culture &c. as above. This is fairly hardy in the Thames Valley, but is not a particularly showy species.

H. Thunbergi. — A Japanese dwarf shrub with slender branches, small ovate oblong leaves, and small cymes of flowers of a delicate peach blossom colour borne in summer, the outermost flowers only being sterile and not much more than ½ in. across.

Culture &c. as above.

H. virens.—An elegant Japanese shrub 2-6 ft. high, with deeply toothed leaves 2-3 in. long, yellowish-green above. Flowers in summer, in small clusters; they are mostly sterile, and have 3 enlarged unequal sepals of a greenish-yellow colour. Very common near Nagasaki, but not yet grown in this country.

SCHIZOPHRAGMA. — A genus containing only one species:—

S. hydrangeoides. — A tall climbing deciduous Japanese shrub resembling *Hydrangea petiolaris*. The ovate heart-shaped tapering leaves, with coarsely toothed margins, are 2–4 in. long, and have long slender stalks. The white or flesh-coloured flowers appear in late summer or autumn in downy flat corymbose cymes, and resemble those of the Hydrangeas &c. in having the outer flowers larger and sterile. The fertile flowers have a top-shaped calyx with 5 teeth; 5 valvate petals, and 10 epigynous stamens inserted at the base of the disc.

Culture and Propagation. — This plant, sometimes called the Climbing Hydrangea, flourishes in good and well-drained garden soil, rich sandy loam with plenty of manure being preferred. In the mild southern and western parts of the kingdom it is quite hardy in ordinary winters, but in less favoured localities it is safer to give it the protection of a wall. New plants are obtained by inserting cuttings of the half-ripened shoots in sandy soil under a bell-glass, or better still in gentle bottom heat. When rooted they may be potted up and sprinkled overhead every day until well-established.

DEUTZIA.—A genus containing 7 species of roughish or downy shrubs with roundish opposite branches, and opposite, more or less deciduous, ovate or lance-shaped serrated leaves. Flowers axillary or terminal, in racemes or corymbs. Petals 5. Stamens 10. Styles 3 or 4.

Culture and Propagation.—Deutzias grow well in any fairly good soil in half sunny, half shady positions in borders or shrubberies; but they luxuriate in rich well-manured sandy loam. Out of doors Deutzias may be increased by layers in the autumn, or by division of the tufts. Cuttings of the ripened shoots 8–12 in. long may be inserted in the autumn like Currant cuttings (see p. 1095), or of the half-ripened shoots in early summer under a handlight.

Most of the kinds may be lifted in autumn if not too large, and grown in pots for conservatory decoration. They should not be forced with too much heat, otherwise the plants will take two or three years to recover from this exhausting process. The protection of a cold greenhouse, however, is quite sufficient to bring the plants into blossom some weeks earlier than those in the open air. Each year after flowering the shoots should be pruned and all old or useless wood cut out. A mulching of well-decomposed cow manure in autumn or winter will also be highly beneficial.

D. corymbosa.—A beautiful Himalayan shrub about 5 ft. high, with oblong or elliptic lance-shaped leaves, and forked corymbose panicles of white flowers.

Culture &c. as above.

D. crenata (*D. Fortunei; D. scabra*). *Pride of Rochester.* — A handsome Japanese shrub 4-8 ft. high, with ovate lance-shaped, somewhat bristly serrulated leaves, rough to the touch. Flowers in summer, white. There are a few varieties, the best being *candidissima*, with a wealth of double snowy white flowers; *flore pleno*, flowers white, double, tinged with purple; and *purpurea-plena*, similar but more purple tinted. *Watereri* and *Wellsi* are supposed forms.

Culture &c. as above.

D. discolor.—A pretty Chinese shrub of recent introduction, and probably 6 ft. or more in height when fully grown. It has dull green lance-shaped toothed leaves 1½–3 in. long, the upper surface being very rough to the touch. The white flowers each about ¾ in. across appear in May and June in compact corymbose clusters at the ends of the branches and also along the side shoots. The variety *purpurascens* has the flowers suffused with rosy-purple.

Culture &c. as above.

D. gracilis.—A Japanese shrub 1-2 ft. high. Leaves small, ovate, pointed, serrated. Flowers in April, white, numerous, in terminal racemes. There is a form called *foliis aureis* which has yellowish-green leaves.

Culture &c. as above.

D. Lemoinei. — This is a beautiful hybrid obtained by crossing *D. gracilis* and *D. parviflora.* It is intermediate between the two parents and flowers freely.

Culture &c. as above.

D. parviflora. — A beautiful Chinese shrub 3-6 ft. high, with ovate lance-shaped toothed and wrinkled leaves, and masses of creamy-white Hawthorn-like blossoms borne in April and May at the ends of the shoots.

Culture &c. as above.

D. staminea. — A Himalayan shrub about 3 ft. high. Leaves 1-2 in. long, oblong or elliptic lance-shaped, greyish downy beneath. Flowers in early summer, white, fragrant, in corymbs.

Culture &c. as above.

DECUMARIA.—A genus containing only one species here described:—

D. barbara.—An ornamental deciduous climbing shrub native of the S. United States, with round branches, and opposite stalked ovate-acute entire or slightly toothed leaves. The white sweet-scented flowers appear about June and are borne in corymbs at the ends of the shoots. The more or less bell-shaped calyx has 7-10 teeth. Petals 7-10, narrowly oblong. Stamens 20-30.

Culture and Propagation. — This plant may be grown against walls in the less favourable parts of the kingdom, or over tree-trunks, trellises, porches &c. in the mildest parts, in the same way as the Climbing Hydrangeas. It thrives in rich sandy loam in warm situations, and is benefited by a good mulching of manure in autumn or winter. It may be increased by cuttings of the half-ripened shoots inserted in sandy soil under a handlight during the summer months. The cuttings should be kept shaded from the sun and sprinkled overhead occasionally until rooted. They may afterwards be given plenty of air and light, and be transplanted in spring.

PHILADELPHUS (Mock Orange). This genus contains about 12 species of deciduous ornamental shrubs with opposite roundish branches. Leaves opposite, entire or serrated, often clothed with starry down. Flowers axillary, solitary, or corymbose, often fragrant. Petals usually 4, rounded or obvovate. Stamens 20-40. Styles 3-5, thread-like.

Culture and Propagation.—The Mock Oranges grow well in fairly good loamy soil. They flower on the wood of the previous year—a fact that should be remembered when pruning or cutting out the branches. They are easily increased from suckers or layers, and also from cuttings 8-9 in. long, inserted in the soil in autumn, and allowed to remain for about 12 months before transplanting.

The plants should always have plenty of air and sunshine and are more effective in beds or groups by themselves than mixed up with all kinds of trees in a shrubbery, where, owing to the absence of light and air, the plants soon become weak-stemmed and straggling.

In the autumn or winter a good top dressing of well-decomposed cow manure over the soil will be of great benefit to the roots and enable them to develop an abundance of blossom the following season.

P. coronarius. — This beautiful tree, 2-10 ft. high, is the well-known European Mock Orange. Leaves ovate pointed, serrate-dentate. Flowers from April to June, white, over 1 in. across, with a strong orange-like scent, and borne in racemes.

There are several fine varieties, the best being *aureus*, with beautiful golden foliage which, however, gradually becomes greener towards autumn; *argenteo-variegatus*, with more or less silvery leaves; *flore-pleno* (*Ketelieri* or *primulæflora*), with double flowers; and *nanus*, a bush about 2 ft. high, but not free-flowering; and *variegatus*, the leaves of which are edged with white.

Culture &c. as above. The type will flourish in almost any soil which is not too wet, and it will flower profusely year after year without the least attention, even in hard baked soil. It is, however, better to treat the plant well, as superior results are obtained. The old wood should be thinned out in winter when necessary.

P. Coulteri. — A pretty hardy shrub, native of N. Mexico. It has slender drooping branches and ovate lance-shaped leaves with serrate margins, and covered with a white down beneath. The white flowers about 1 in. across appear in early summer singly at the ends of the branches.

Culture &c. as above. Requires the same treatment as *P. mexicanus*.

P. Gordonianus.—A native of N.W. America, about 10 ft. high, with ovate-pointed, serrulate leaves. Flowers in July, white, scentless, borne in racemes in great abundance.

Culture &c. as above.

P. grandiflorus (*P. speciosus*). — A handsome shrub 6–10 ft. high, native of the S. United States, with rather slender twiggy stems. Leaves ovate, pointed or nearly rounded, irregularly toothed, downy when young. Flowers in June, white, large, fragrant, 3–4 in. across, with roundish or broadly obovate petals and a bunch of yellow stamens in the centre. The variety *floribundus* is a very free-flowering form and the variety *laxus* may be recognised by its dwarfer habit, leaves covered with a hairy down beneath, and flowers either solitary or in threes. *P. inodorus* is a scentless form.

Culture &c. as above.

P. hirsutus. — A very pretty free-flowering species 3–5 ft. high, native of N. America. Leaves oblong-ovate, acute, toothed, hairy on both sides, white beneath. Flowers in June, white, solitary and in threes, covering the whole plant.

Culture &c. as above.

P. Lemoinei. — This is a beautiful hybrid between *P. coronarius* and *P. microphyllus*. Leaves lance-shaped, more or less pointed, slightly toothed, 3-nerved. Flowers in June, white, over 1 in. across, petals oblong-ovate, denticulate on the edges. The variety *erectus* is erect growing in habit; *Boule de Neige* (a cross between *Lemoinei* and the double-flowered form of *coronarius*), beautiful double white, fragrant.

Culture &c. as above.

P. Lewisi.—A North American shrub 6–8 ft. high. Leaves ovate acute, almost entire, with fringed margins. Flowers in June, white, rather smaller than those of *P. hirsutus*.

Culture &c. as above.

P. mexicanus.—A beautiful Mexican Mock Orange 4–8 ft. high, with ovate acute or tapering leaves 2–2½ in. long, having a few distant teeth on the margins, and more or less downy according to age. The pure white circular flowers, over 2 in. across, with a conspicuous cluster of golden-tipped stamens in the centre, are borne singly in May and June at the ends of the slender and more or less hairy shoots.

Culture &c. as above. This species is too tender for the northern and bleaker parts of the kingdom, but in the mildest places in the south and west is practically hardy in ordinary winters.

P. microphyllus. — A dense bushy species about 3 ft. high, with ovate lance-shaped myrtle-like leaves ½–¾ in. long, somewhat 3-nerved, and slightly hairy beneath. Flowers in summer, white, fragrant, solitary or in threes, borne in great profusion. It is a native of Colorado, and although not many years in cultivation has already been used by the hybridist to produce the beautiful *P. Lemoinei* mentioned above.

Culture &c. as above. Grown in small groups on the grass or in front of taller shrubs it makes a very effective picture in the garden.

P. Satsumi (*P. japonicus*).—A slender free-growing Japanese bush 4–6 ft. high, with long narrow leaves, and white flowers about 1½ in. across, produced in pairs at the ends of the shoots in July.

Culture &c. as above.

PLATYCRATER.—A genus having only the one species described here:—

P. arguta. — A trailing or creeping deciduous Japanese shrub, with round branches and opposite short-stalked lance-shaped tapering leaves, deeply toothed on the margins and distinctly veined. The greenish-white flowers appear in summer, and are borne in corymbs at the ends of the shoots. The outer blossoms are sterile and larger than the others, as in the Hydrangeas, but much larger. The calyx has 5 triangular acute lobes. Petals 4, valvate. Stamens numerous, in many whorls. Styles 2.

Culture and Propagation.—This plant flourishes in ordinary garden soil and may be used for clambering over boulders of rock or old tree trunks in open sunny situations. It may be increased by cuttings of the ripened shoots 8–9 in. long inserted in warm sheltered places in autumn, or of the half-ripened shoots placed under a handlight in summer and kept shaded and sprinkled overhead until rooted. Layers of the branches may also be made in late summer and autumn and detached the following spring if well rooted.

JAMESIA.—A genus with only one species, the description of which below contains the generic characters:—

J. americana.—A pretty dwarf deciduous shrub 2–3 ft. high, native of the Rocky Mountains of Colorado. Leaves opposite, ovate, serrated, white beneath. Flowers in June, white, about ½ in. across, in terminal paniculate cymes. Calyx lobes triangular-ovate, sometimes 2-cleft. Petals 5, obovate. Stamens 10. Ovary conical. Styles 3–5, united at the base.

Culture and Propagation.—This shrub thrives in fairly good well-drained garden soil, and may be used in the borders or shrubberies, or in round beds on grass. It may be increased by seeds sown as soon as ripe in cold frames, or in spring in gentle heat. Cuttings of the mature shoots placed in sandy soil under a handlight in autumn will also root, and produce good plants by the following year or next.

CARPENTERIA.—Like the preceding, there is only one species in this genus:—

C. californica.—A handsome flowering shrub 6–10 ft. high, native of the Sierra Nevada, California. Leaves broadly lanceolate entire, 2–3 in. long, 3-nerved at the base. Flowers in June, white, 2–3 in. across, like the white Japanese Anemone, in racemose cymes. Calyx lobes 5–7. Petals 5–7, oblong obovate or roundish. Stamens numerous, inserted beneath the roundish flask-shaped ovary, looking very conspicuous with their golden anthers in the midst of the white blossoms.

Culture and Propagation. — This lovely shrub thrives in light warm soil, and requires protection except in the milder parts of the country. It may be grown in large pots, as a bush plant, and will thus be easy to place in a greenhouse in winter, or it may be trained on a south wall. It is increased from seeds sown in gentle heat or by layers made in late summer or autumn and detached the following spring when well rooted. Cuttings of the half-ripened shoots may also be inserted in sandy soil under a handlight and kept shaded and sprinkled overhead until rooted. Suckers from the base may also be detached with as many roots as possible, and if planted in good soil in showery weather in autumn will grow well.

Tribe IV. Escallonieæ.—Trees or shrubs. Leaves alternate, without stipules, simple, often leathery and glandular serrate. Stamens often equal to the petals in number.

ESCALLONIA.—A genus with 35 species of pretty evergreen shrubs, with white or red flowers in terminal panicles, or more rarely axillary. Calyx lobes 5, ovate or awl-shaped. Petals 5, linear spoon-shaped; claw erect, limb spreading. Stamens 5, epigynous. Ovary inferior; stigma capitate, 2–3-lobed.

Culture and Propagation.—In the milder parts of the country Escallonias are perfectly hardy, and in many places make beautiful hedges. In unfavourable parts of the kingdom, from the Thames Valley northwards, they are safer trained on a south wall. They grow in ordinary garden soil, and may be increased by cuttings of the half-ripened shoots, in sandy soil under a glass, or by layers or suckers. Many kinds ripen seed freely, and new plants can be obtained by sowing them as soon as ripe in cold frames, or in spring in gentle heat, afterwards pricking the seedlings out and growing on under glass until large and strong enough for the open air.

E. illinita. — A Chilian shrub about 5–6 ft. high, with resinous branches and more or less oblong obovate leaves with crenulate margins, and somewhat clammy to the touch. The white flowers with long-clawed petals appear about August, in branched racemes or panicles at the ends of the shoots.

Culture &c. as above.

E. langleyensis is a graceful hybrid, more or less straggling in habit. Leaves about 1 in. long, obovate, toothed, shining green. Flowers in June, rose-purple, in the axils of the leaves for some distance along the branches. The parents of this hybrid were *E. macrantha* with crimson-red flowers and *E. philippiana* with white ones.

Culture &c. as above.

E. macrantha.—A beautiful shrub 3–6 ft. high, native of Chiloe. Leaves ovate-elliptic, bluntish, serrate, shining, dotted beneath. Flowers in June, crimson-red, rather large. This is also known as *E. Ingrami* in some gardens.

Culture &c. as above.

E. montevidensis (*E. floribunda*). — A native of New Granada 10 ft. high. Leaves oblong, blunt, finely crenulated or entire. Flowers in July, white, in much-branched leafy corymbs at the ends of the branches.

Culture &c. as above.

E. organensis.—A handsome shrub 2–4 ft. high, native of the Organ Mountains, having rich red-brown stems and branches. Leaves oblong, blunt, deep glossy with red margins. Flowers in summer, deep rose.

Culture &c. as above.

E. philippiana.—A beautiful Valdivian shrub 3–5 ft. high, with rich green, rather spoon-shaped, serrated leaves, and densely crowded panicles of white flowers in July at the ends of the branches. This shrub is hardy in the Thames Valley, and makes a fine bush. The hybrid varieties ***exoniensis*** and ***leucantha*** are desirable on account of flowering till late in the autumn.

Culture &c. as above.

E. pterocladon.—A Patagonian shrub about 4 ft. high, remarkable for the peculiar winged branches, and small leaves. Flowers in July, white and pink, small, but in great profusion along the branches.

Culture &c. as above.

E. pulverulenta. — A hairy Chilian shrub 6-10 ft. high. Leaves elliptic, serrulate, rather clammy above when young. Flowers in June, white, in erect racemes at the ends of the branches.

Culture &c. as above.

E. punctata (*E. rubra punctata*). — A native of Chili 3-6 ft. high. Leaves bright green, elliptic acute, finely and often unequally toothed. Flowers in July, deep red, in terminal corymbs. This plant may be easily distinguished from *E. rubra* by the stalked glands on the young shoots, flower stalks &c.

Culture &c. as above.

E. revoluta (*E. affinis*). — A Chilian shrub 3–6 ft. high, having softly downy branches and obovate acute leaves 1–2 in. long with toothed and recurved margins. The white flowers, each about ½ in. long, are borne in late summer or autumn in branched racemes at the ends of the shoots.

Culture &c. as above.

E. rubra.—A rather smooth Chilian shrub 3–6 ft. high, clothed with glandular hairs when young. Leaves obovate-oblong, pointed, toothed, with resinous dots beneath. Flowers from July to September, red, 2–7 on a stalk.

Culture &c. as above.

ITEA.—A small genus of trees or shrubs with alternate, stalked, oblong or lance-shaped leaves with glandular toothed or crenate margins. Flowers small, white, in terminal and axillary racemes. Calyx more or less bell-shaped, with 5 ovate or awl-shaped persistent lobes. Petals 5, perigynous, linear, some what erect, spreading or reflexed. Stamens 5. Ovary superior or half superior, 2-celled.

I. virginica. — An ornamental deciduous shrub 6–8 ft. high, native of the E United States, with deep green oblong oval and minutely serrate leaves. The small white flowers appear in horizontal sprays in June, and very much resemble those of the Common Privet (p. 644). Owing to their great abundance they make a fine display against the deep green foliage.

Culture and Propagation.—This plant thrives in ordinary good sandy loam with a little peat or leaf soil added. It may be increased by seeds sown in cold frames as soon as ripe, or in spring in gentle heat. It may also be layered in late summer or autumn, and the suckers from the base may likewise be removed and transplanted in mild showery weather in autumn. Cuttings of the half-ripened shoots may also be rooted in sandy soil under a hand-light. In autumn plants, if not too large, may be lifted and grown in pots for conservatory decoration in spring.

Tribe V. RIBESIEÆ.—Shrubs with alternate simple leaves. Stipules none or adnate to the leaf stalk. Flowers usually in racemes. Ovary inferior. Seeds immersed in pulp (as in Gooseberry).

RIBES (CURRANT; GOOSEBERRY).—A genus containing nearly 60 species of spiny or unarmed shrubs, with the characters of the tribe. Calyx-tube ovoid or spherical with a 4–5-parted limb; lobes usually coloured, erect or recurved. Petals 4–5, small, scale-like, inserted with the 4–5 stamens on the throat of the calyx. Styles 2, distinct or united. Berry oblong or round, pulpy.

Only the ornamental flowering shrubs belonging to the genus Ribes are described here. The Currant (*R. rubrum* and *R. nigrum*) and the Gooseberry (*R. Grossularia*) are dealt with in the Fruit section of this work (see pp. 1092, 1095).

Culture and Propagation. — The Flowering Currants thrive in any good garden soil, and are beautiful enough to deserve better treatment than they usually receive. In groups by themselves they are far more effective than when smothered in shrubberies. They are easily increased by layers, or by cuttings of the ripened shoots about 9 in. long in autumn, as in the case of the cultivated Currant (p. 1095). Seeds are ripened freely by many kinds, and may be sown as soon as ripe in cold frames, or in spring in gentle bottom heat. The seedlings should be pricked out and grown on until large enough to transfer to the open in mild showery weather in spring or autumn. To keep the plants in a good healthy condition and proper shape, a little pruning in winter may be practised, chiefly with a view to thinning out old or useless branches, and to prevent the centre of the bushes becoming choked with weak growths.

R. alpinum. — A compact-growing spineless shrub 3–5 ft. high, native of the Northern hemisphere, and often found growing wild in parts of Britain. Its slender branches are furnished with broadly ovate leaves 1½–2 in. across, somewhat 3–5-lobed and coarsely serrate, and more or less hairy on both surfaces. The yellowish-green flowers appear in April and May, and are not particularly attractive. The sexes however are distinct, the males and females being borne on separate bushes.

Culture &c. as above. Useful for planting in poor soil and in shady places. There is a yellow-leaved variety (*aureum*), and also a dwarf form called *pumilum*.

R. americanum (*R. floridum*; *R. missouriense*).—A spineless N. American shrub about 4 ft. high. Leaves rather heart-shaped, 3–5-lobed, and doubly serrate, in autumn assuming a beautiful bright purple-bronze colour suffused with gold and crimson. Flowers in May, whitish, in drooping downy racemes.

R. aureum (*Buffalo Currant*). — A smooth, spineless N. American shrub 6–8 ft. high, with 3-lobed, irregularly toothed leaves. Flowers in April and May, golden-yellow, in long racemes. Fruit yellow, rarely black. The variety *præcox* flowers earlier than the type, and *serotinum* later, and finer. The variety known as *aurantiacum minus* is one of the best, its flowers being of a deep orange-yellow and sweet-scented. There are other less well-known forms, as *tenuiflorum*, and its variation *fructu-nigro*, the fruits of which change from yellow to red and then blackish-purple.

Culture &c. as above.

R. cereum (*R. inebrians*).—A pretty spineless N. American shrub 3 ft. high. Leaves almost round, bluntly 3-lobed, crenate, viscid. Flowers in May, white, tinged with pink, 3–5 on a drooping, downy raceme.

Culture &c. as above.

R. gordonianum (*R. Beatoni*; *R. Loudoni*). — A distinct and beautiful hybrid between *R. aureum* and *R. sanguineum*, the character of each being transmitted and mingled, the flowers being reddish tinted with yellow.

Culture &c. as above.

R. Lobbi.—A rare Californian shrub 3–5 ft. high, with prickly stems and lobed and toothed leaves like an ordinary Gooseberry bush, being also furnished with triple spines. The deep reddish-purple flowers appear in April and May, 1–3 on each stalk. The calyx lobes are spreading and thus give the flower a diameter of about an inch.

Culture &c. as above.

R. multiflorum.—A graceful shrub 5–6 ft. high, native of the Carpathian Mountains. Leaves heart-shaped, 5-lobed, hairy beneath. The greenish - yellow flowers appear in May, and are borne in graceful drooping racemes 4–6 in. long in great abundance, thus giving the shrub a distinct and even ornamental appearance.

Culture &c. as above.

R. sanguineum (*Flowering Currant*). A beautiful spineless shrub 4–10 ft. high, native of N.W. America. Leaves heart-shaped, 5-lobed, serrated, smoothish above, rather hairy beneath. Flowers in April and May, deep rose, in drooping, downy racemes.

There are a few varieties, but the deeper and more brilliant-flowered ones are best. The one called *atrorubens* or *splendens* is very fine; *albidum* has white flowers tinged with pink; *flore pleno* (Burning Bush) has beautiful double flowers; *glutinosum* has pale rosy flowers, and rather clammy foliage; and *malvaceum* has lilac-tinted flowers in short dense racemes, and roughish hairy leaves with a white cottony down on the under surface. Other varieties are *atrosanguineum* and *carneum*.

Culture &c. as above.

R. speciosum (*Fuchsia - flowered Currant*). — A handsome Californian shrub, 6–8 ft. high, more or less hairy and prickly. Leaves somewhat 3-lobed, incised, crenate. Flowers in May, deep-red, or crimson, 4-parted, cylindrical, resembling some of the Fuchsias in appearance, drooping in small clusters, and remarkable for the much-protruding stamens.

Culture &c. as above. Increased by seeds or cuttings.

XLI. CRASSULACEÆ—Stonecrop and Houseleek Order

An order containing 400 species of usually fleshy herbs with opposite or alternate, sometimes united leaves, often crowded at the ends of the branches in rosettes. Stipules none. Flowers usually in cymes, hermaphrodite, regular. Calyx free, persistent, 3–5 rarely 6–30-parted. Petals 3–5, rarely more, free, or more or less united. Stamens as many or twice as many as the petals, perigynous, or nearly hypogynous, usually free. Carpels 3–5, rarely more, free.

GRAMMANTHES.—A genus with one or two species, natives of S. Africa, and having the characters here given under the following species:—

G. chloræfolia.—A pretty half-hardy annual 3–4 in. high, forming a dense tuft of ovate acute, fleshy leaves about ½ in. long. Flowers in summer, orange-yellow at first, changing to red, with a distinct V-shaped mark at the base of each petal. Calyx bell-shaped, 5-cleft to the middle. Corolla tube with 5–6 spreading lobes. Stamens 5–6, adnate to the corolla tube. Carpels 5–6. *G. gentianoides* is similar, with a profusion of crimson or scarlet flowers tinged with yellow.

Culture and Propagation.—The plants thrive in dry parts of the rock garden and may be raised from seeds sown in heat about February or March. As the seeds are very minute they require scarcely any covering with soil. When the seedlings are well above the surface they may be pricked out into light rich sandy soil, and will be fit for transferring to the open ground at the end of May or beginning of June. Warm, sunny, and fairly dry positions are necessary to grow this plant well. Stagnant moisture at the roots is fatal, and plenty of sunshine is essential to secure the full expansion of the blossoms.

COTYLEDON (Navel Wort). — A genus with which is now included the well-known *Echeveria*. The main characters of Cotyledon proper are: Calyx 5-parted. Corolla gamopetalous, with 5 reflexed lobes. Stamens 10, inserted on the corolla tube. Carpels 5, free. Natives of the Cape.

Echeverias differ chiefly in often having leafy sepals, and in being mostly natives of Mexico (one from Peru and another from Japan).

Culture and Propagation. — These plants thrive in ordinary well-drained garden soil. They may be increased by seeds sown as soon as ripe under glass protection and in finely sifted soil. The more usual way, however, is to detach the offsets, which are freely produced, and insert them either in the open border until the end of autumn or in shallow boxes in sandy soil. In the case of *Echeveria secunda glauca*, offsets can be induced to form freely by cutting off the chief rosette of leaves, leaving the thick fleshy stems in the soil. In a short time all round the edge of the cut stems offsets will be produced and may be taken off and inserted in shallow boxes. The chief rosette if simply placed on the soil will in the meantime have taken root and begun to produce offsets as well. A shady border is the best place for carrying out these operations in July and August.

Where offsets are not readily produced each leaf (which, however, should be pretty well mature) may be slightly stuck into dry sand in pans or boxes. After a short time small plants will develop from the base of the leaves, and then they should be gently watered and grown on until large enough to put into pots singly or several in boxes or pans.

Seeds are freely ripened and may be sown in autumn or spring in cold frames, or in gentle heat in light and rich sandy soil. When the seedlings are old enough they may be pricked out a couple of inches apart, and when fully grown are available for the outdoor garden.

These plants, although not proof against hard frost, will stand the winter well in a cold airy frame, and can easily be protected from severe weather by mats.

The Cotyledons and Echeverias are chiefly used for edging flower borders from early summer till the end of autumn.

C. metallica (*Echeveria*).—A beautiful Mexican succulent plant, 1–2 ft. or more high, with a large rosette of broad obovate spoon-shaped leaves 6 in. or more across and of a beautiful purplish glaucous metallic hue. Flowers in summer, yellow, tipped with red, 30–60 in a loose clustered panicle.

Culture &c. as above.

C. secunda (*Echeveria*).—A beautiful edging plant, native of Mexico. Leaves in rosettes 3–5 in. wide, wedge-shaped, glaucous. Flowers during summer, red and yellow, on long curved stalks, very beautiful. The variety *glauca* has bluish-white leaves; *glauca major* is a large-leaved form; and *ramosa* is a monstrosity with a flat stem covered with small, green, abortive leaves.

Culture &c. as above.

C. Sempervivum (*Umbilicus Sempervivum*).—A pretty hardy species 4–6 in. high, with rosettes of ovate, dull green leaves tinged with brown. Flowers in August and September, deep red.

Culture &c. as above.

C. spinosa (*Sempervivum spinosum*). A hardy Asiatic species about 1 ft. high. Lower leaves in rosettes, spoon-shaped, becoming lance-shaped and flattish upwards. Flowers in June, yellow.

Culture &c. as above.

C. Umbilicus.—A hardy British plant about 6 in. high. Lower leaves shield-like, roundish, crenated. Flowers in June, yellow, Useful for the rock garden or hardy fernery.

Culture &c. as above.

SEDUM (Stonecrop; Orpine). — A genus containing about 120 species of succulent, usually prostrate, annual or perennial herbs, sometimes tufted or mossy, with alternate opposite and whorled leaves, entire or serrate, rarely laciniated. Flowers in cymes, hermaphrodite, or 1-sexed by abortion. Calyx 4–5-lobed. Petals 4–5 (rarely 6–7), free. Stamens 8–10 (rarely 12–14), perigynous. Carpels 4–5, free or rarely united at the base.

Culture and Propagation.—Sedums thrive in almost any soil and in any situation. The dwarf mossy kinds are at home on rockwork, old walls, ruins, as well as in the border as edgings, or raised mounds. They are easily increased by seeds, cuttings, or division, new plants arising from the tiniest morsels of some of the plants when put on moist soil in a shady place, either in early autumn or in mild weather in spring.

For garden purposes it is unnecessary to describe the whole 120 species, but the following will be found a good selection.

S. acre (*Wall Pepper*). — A smooth British evergreen 2–4 in. high, with small, thick, alternate, stalkless leaves, ovate or nearly round. Flowers in early summer, yellow. *Aureum* is a fine variety with bright golden-yellow leaves in spring, but not quite so hardy as the type; *elegans* is a silvery-leaved, delicate form; and *majus* is a robust one with flowers ¾ in. across. *Maweanum* is another form.

Culture &c. as above.

S. Aizoon.—A Siberian species 1 ft. or more high with smooth, rather angular stems. Leaves stalkless, alternate, 2½ in. long, oblong lance-shaped, coarsely and irregularly toothed, with a prominent midrib. Flowers late in summer, yellow, ½ in. across, numerous.

Culture &c. as above.

S. album (*S. formosum; S. neglectum*).—A pretty British evergreen with alternate, spreading, linear-oblong, blunt leaves ½ in. long. Flowers in summer, white, nearly 1 in. across, on pinkish stems 4–6 in. high. The variety *brevifolium* has shorter and thicker leaves; *micranthum*, smaller flowers, and flattened leaves; and *teretifolium*, with blunt (instead of lance-shaped) petals and sepals and leaves rather rounded.

Culture &c. as above.

S. Anacampseros.—A glaucous evergreen native of Central Europe. Leaves roundish or obovate, blunt, apiculate, lobed at the base, and margined with red. Flowers in July, violet, numerous, about ¼ in. across, rarely produced.

Culture &c. as above.

S. anglicum.—A pretty little evergreen species, native of Britain, and seen best in a wild state in rocks and banks by the sea. Leaves ovoid oblong, ⅛–¼ in. long, swollen at the base. Flowers from June to August, pure white or rose-tinted, ⅓ in. across, on stems 2 in. high.

Culture &c. as above.

S. cæruleum.—A charming little annual or biennial from the Mediterranean region. Leaves tufted, ¼ in. long, oblong, blunt, pale green dotted with red. Flowers in July, pale blue, ¼ in. across, on stalks 2–3 in. high.

Culture &c. as above.

S. erythrostictum.—A handsome Japanese species, with erect greenish stems 1–1½ ft. high. Leaves 2½ in. long, concave, oblong, sinuate, obscurely toothed, tapering into short stalks, or sessile. Flowers in autumn, greenish flushed with pink, nearly ½ in. across.

Culture &c. as above.

S. Ewersi.—A somewhat tender Siberian evergreen. Leaves opposite, stalkless, roundish, about ½ in. wide, entire or slightly sinuate. Flowers late in summer, pink or pale violet, numerous; petals dark spotted.

Culture &c. as above.

S. glandulosum.—A glandular hairy annual native of Spain, with simple or forked stems 2–6 in. high. Leaves scattered, sessile, ⅓ to ⅔ in. long, linear oblong, blunt, cylindric. Flowers in June, pale reddish-purple, ⅓ in. across.

Culture &c. as as above.

S. glaucum.—A pretty glaucous evergreen species, native of Central Europe. Leaves densely crowded, ¼ in. long, linear, glaucous, becoming reddish, tipped with translucent dots. Flowers in summer, pinkish-white, ½ in. across, 6-parted. This species is also known as *S. dasyphyllum*. The variety *platypetalum* has 7–9 petals.

S. japonicum.—A pretty Japanese evergreen. Leaves scattered or opposite, rather reflexed, oblong spoon-shaped acute, channelled above, bright green. Flowers in summer, yellow, ½ in. across.

Culture &c. as above.

S. kamtschaticum (*S. selskyanum*). An evergreen species native of Kamtschatka, with green or purple branches 6–8 in. long. Leaves about 2 in. long, oblong obovate, deep green, toothed towards the apex, with minute warts on the edges. Flowers late in autumn, yellow, ¾ in. across, on stalks 4–6 in. high.

Culture &c. as above.

S. Lydium (*S. lividum*).—A pretty little species from Asia Minor. Leaves crowded, ¼ in. long, linear, roundish, greenish or tipped with red, lobed at the base, with minute pimples at the apex. Flowers late in summer, pinkish, less than ⅓ in. across, on shoots 4–5 in. long.

Culture &c. as above. This species is excellent for edging slopes, footpaths &c., or for carpet-bedding.

S. Maximowiczi.—A Siberian Stonecrop with strong erect stems 1½–2 ft. high, furnished with alternate oval lance-shaped deep green leaves, the upper whorls of which have crenulate margins. The brilliant yellow blossoms appear in July in large flattish heads well above the foliage.

Culture &c. as above. An excellent plant for the rockery or border where it will flourish in rather dry sunny places for several years without much attention.

S. maximum.—A native of Europe and Asia with erect green or purple stems 1–2 ft. high. Leaves stalkless, stem-clasping, about 3 in. long, ovate acute, more or less heart-shaped, crenate-toothed. Flowers late in summer, whitish, on long stalks; petals spotted with red at the apex.

There are many forms of this very variable species, but *hæmatodes*—a Portuguese variety—is perhaps the best of them all. It has erect purplish stems 2–2½ ft. high, and purplish, oblong ovate, blunt, coarsely toothed leaves, about 5 in. long, and flowers as in the type. *Atropurpureum* is another deep coloured form.

Culture &c. as above.

S. populifolium.—A Siberian and N. American Stonecrop with rather woody branching stems 12–18 in. high, furnished with alternate stalked bright green leaves, ovate acute in outline, unequally toothed on the margins. The starry pink and white flowers with purple stamens appear from July to September in dense masses at the ends of the shoots.

Culture &c. as above. A good plant for the rock garden facing north or east. Increased by cuttings of the non-flowering shoots.

S. pulchellum.—A handsome species from the United States, with slender trailing branches 3–6 in. long. Flowers in summer, rosy-purple, ½ in. across.

Culture &c. as above.

S. reflexum (*S. collinum ; S. virens*). A variable evergreen species, native of Britain, Europe &c., with trailing stems. Leaves in 6–7 rows, crowded into a conical mass, ½–¾ in. long, linear awl-shaped, roundish, swollen at the base, spreading or abruptly decurved. Flowers in summer, yellow, ¾ in. across, 4–8-parted, on stems 8–10 in. high. The variety *monstrosum* has flattened stems and leaves clustered on top as in the Cockscomb.

Culture &c. as above.

S. roseum (*Rhodiola rosea*). — *Rose Root.*—A pretty British plant with fleshy stems 6–18 in. long. Leaves 1–1½ in. long, glaucous, larger and more crowded upwards, obovate oblong acute, toothed at the apex. Flowers from May to August, ¼ in. across, yellow or purplish. There are one or two varieties. *S. involucratum* from the Caucasus is closely related. It has flat roundish toothed leaves and flesh-coloured flowers produced from May to July.

Culture &c. as above.

S. rupestre.—Another British species with stout, loosely tufted, green or pinkish stems. Leaves ⅛–1 in. long, smooth, linear-lance-shaped acute, swollen at the base. Flowers in June and July, ⅔ in. across, golden-yellow, on leafy stems 6–10 in. high. The variety *monstrosum* is a rather slow-growing plant with flattened (fasciated) twisted stems, on the upper edges of which the glaucous leaves are borne like the flowers of the Cockscombs. *S. albescens*, *S. altissimum*, and *S. elegans*, all with yellow flowers, are closely related and are useful for the decoration of rockwork or for making edging to borders.

Culture &c. as above.

S. sarmentosum (*S. carneum variegatum*).—An elegant Chinese Stonecrop with creeping and rooting stems bearing sessile linear leaves either opposite or in threes, and of a bright green edged with white. The younger leaves are sometimes quite white. The golden-yellow star-like flowers, although individually insignificant, are produced in great profusion in cymes or panicles in June and July.

Culture &c. as above. An excellent plant for the rockery or for hanging pots &c. It is easily increased by cuttings of the ends of the shoots. In the colder parts of the country it requires protection in winter.

S. sempervivoides. — A very pretty downy species 4–8 in. high, from Asia Minor. Leaves in dense rosettes like the House Leek, 1 in. long, obovate wedge-shaped; those of the flower stem-clasping, greenish-red, oblong, acute. Flowers in July, bright red, over ½ in. across, on hairy stalks.

Culture &c. as above.

S. Sieboldi.—A pretty trailing Japanese species, hardy in most parts of the country but usually grown in greenhouses. Leaves in whorls of 3, sessile or nearly so, roundish, sinuate, bluish-green, with pinky edges, about ¾ in. wide. Flowers in August, about ½ in. across, pinkish, numerous; petals with a green spot on the back near the top. The variety *variegatum* has a central creamy white blotch on each leaf. More tender than the type.

Culture &c. as above. This species, and its variety especially, is frequently grown as a pot plant, and may often be seen hanging in cottagers' windows. It is a graceful plant for the rockery or for hanging baskets &c.

S. spathulatum.—A pretty Stonecrop from British Columbia. It has spoon-shaped grey-green fleshy leaves and produces masses of golden-yellow flowers in summer.

Culture &c. as above. This species is quite hardy and looks effective as an edging or in the rock garden.

S. spectabile (*S. Fabaria*).—A vigorous Japanese species, 1–2 ft. high. Leaves opposite, in pairs alternately crossing, or in whorls of 3, 3 in. long, barely stalked, or the upper ones stalkless, ovate, blunt, or spoon-shaped, entire or slightly toothed. Flowers in September, pink, numerous, ½ in. across, twice as long as the whitish sepals. There is a variegated form in which the leaves are heavily blotched with yellowish-white.

Culture &c. as above. This species makes an excellent pot and a good window plant, and will also succeed out of doors in shady as well as sunny places.

S. stoloniferum (*S. dentatum; S. denticulatum; S. spurium*).—A Caucasian evergreen with trailing, sometimes brown-dotted stems. Leaves ¾–1¼ in. long, wedge-shaped, spathulate, coarsely toothed towards the apex, margined with translucent pimples. Flowers in July and August, pink or white, numerous, ¾ in. across, on reddish stalks about 6 in. long. *S. ibericum* is a form with small white flowers and ciliolate leaves.

Culture &c. as above.

S. Telephium.—A very variable British plant with stout green or red spotted stems 1–1½ ft. high. Leaves 1–3 in. long, ovate or oblong, blunt, flat or concave, bluntly toothed or serrate. Flowers in July and August, ⅓ in. across, rosy-white or speckled, in dense corymbose cymes.

Culture &c. as above.

SEMPERVIVUM (House Leek).—A genus containing 40 to 50 species of thick fleshy herbs or undershrubs, varied in habit, often stemless and emitting young plants from the axils, sometimes caulescent and leafy. Leaves alternate, thickly fleshy, often in dense rosettes, and revolute. Flowers often in densely panicled cymes. Calyx 6–8- (rarely 5-) cleft or parted. Petals 6–8, free, oblong or lance-shaped, acute or pointed. Stamens usually twice as many as the petals, rarely equal in number. Carpels as many as the petals.

Culture and Propagation.—All the hardy House Leeks grow well in dry sandy soil, and are suitable for the rockery, on old walls or ruins, as edgings round beds or borders &c. They are easily multiplied by detaching the young plants produced round the base, or from seeds sown in finely sifted sandy soil, under glass as soon as ripe, or in spring. As soon as the young plants are large enough they may be pricked out into well-drained sandy soil, and it is safer to cultivate them in pots in cold frames for the first year before transferring them to their permanent positions in the open air.

S. arachnoideum.—A very distinct species native of the Pyrenees and Central Europe. Leaves oblong wedge-shaped, in dense rosettes, veiled with white cobweb-like hairs. Flowers in June, bright red, 9–12-parted, less than 1 in. across, on stems 3–4 in. long. The variety *Laggeri* is a large one with rosettes 1½ in. across.

Culture &c. as above.

S. arenarium (*S. cornutum*).—A pretty Tyrolese species with rosettes of oblanceolate acute leaves, minutely ciliated on the edges, the outer ones tinged with brown, ½–¾ in. long. Flowers in summer, pale yellow, ½–⅝ in. across, in dense heads, on downy stems 6–9 in. high.

Culture &c. as above.

S. arvernense.—A native of the French Alps, closely related to *S. calcareum*, but having smaller rosettes of oblong ciliate leaves, which are either smooth or slightly covered with glandular hairs. The floral stems are about 9 in. high, and bear bright rosy flowers in summer.

Culture &c. as above.

S. atlanticum.—A native of the Greater Atlas Mountains, with rosettes 2–3 in. in diameter of oblanceolate wedge-shaped, pale green leaves, slightly tipped with red-brown, fringed on the margins, the outer leaves 1–1½ in. long. Flowers in summer, pale red, 1 in. across, 12-parted, on stems about 1 ft. high with leafy red-brown bracts.

Culture &c. as above.

S. barbatulum. — A distinct species 3-6 in. high, native of the Alps. Leaves in small rosettes, velvety, ciliated on the margins and furnished with a dense tuft of white, cobwebby hairs. Flowers in summer, bright rose, on stems 3–4 in. high, with red downy bracts ½–¾ in. long. *S. piliferum* is closely related to this. It has smooth blue-green leaves slightly ciliated at the edges, and webbed with small white hairs. Flowers rosy.

Culture &c. as above.

S. Boissieri.—A garden species with dense rosettes, 2–3 in. in diameter, of wedge-shaped pointed leaves, over 1 in. long, ciliated with brown hairs. Flowers in July, pale red, very hairy, 1 in. across, 12–14-parted,

Culture &c. as above.

S. boutignyanum.—A Pyrenean species with rosettes 2–3 in. in diameter, pale glaucous green, often lined with red outside, brownish-red at the top, pale rose at the base. Flowers in summer, pale rose, with darker lines at the base, ¾ in. across, 12–14-parted, on stems 6–8 in. high.

Culture &c. as above.

S. Brauni.—A Tyrolese species with rosettes 1–2 in. in diameter. Leaves glandular downy, outer ones slightly tipped with purple, ¾–1 in. long. Flowers in July, dull yellow with a green keel, ¾–1 in. across, 10–12-parted, on downy stems 6–9 in. long.

Culture &c. as above.

S. calcaratum (*S. Camollei; S. italicum; S. juratum; S. Royeni; S. rusticanum; S. Seguieri*). — A rather common plant with rosettes 3–4 in. across. Leaves 4 in. long, glaucous, distinctly tipped with red-brown, and edged with stiffish hairs. Flowers in summer, dull reddish-white, 1 in. across, on tufted and branched stems over 1 ft. long.

Culture &c. as above.

S. calcareum (*S. californicum*).—A native of the chalky Alps of Dauphiny, with rosettes 2 in. in diameter. Leaves 1-1½ in. long, very glaucous, tipped with red-brown, edged with stiffish hairs. Flowers in summer, ¾ in. across, pale red with a greenish keel, densely fringed, 10–12-parted, on stems less than 1 ft. high.

Culture &c. as above.

S. fimbriatum. — A native of the European Alps with rosettes 1–1½ in. in diameter. Leaves ½–¾ in. long, green, strongly fringed with deflexed hairs, and tipped with purple-red. Flowers in July, bright red, 1 in. across, on densely glandular hairy stems 6–9 in. high.

Culture &c. as above.

S. flagelliforme. — Supposed to be a Siberian species. Rosettes 1–1½ in. in diameter, the leaves pale green, fringed with short hairs. Flowers in June, bright red, over 1 in. across, densely glandular hairy outside, on stems 3–4 in. high.

Culture &c. as above.

S. Funcki.—A Tyrolese species with rosettes 1½–2 in. in diameter, surrounded by a circle of young ones on bright red stalks. Leaves green and smooth when old, fringed with dense hairs, and not tipped with red-brown. Flowers in July, rosy, nearly 1 in. across, on densely hairy stems 6–9 in. high.

Culture &c. as above.

S. glaucum.—A native of the Simplon Alps, with rosettes 2–3 in. in diameter. Leaves smooth, edged with hairs, faintly tipped with reddish-brown. Flowers in summer, bright red, 1 in. across, with deep purple filaments; on stems 6–9 in. high, hairy above.

Culture &c. as above.

S. grandiflorum (*S. globiferum*).—A native of the Alps, with rosettes about 1½ in. in diameter, and numerous round, brownish-green offsets. Leaves downy, tipped with reddish-brown. Flowers in summer, 1¼–1½ in. across, pale yellow flushed with purple inside at the base, in dense heads on stems 3–4 in. high.

Culture &c. as above.

S. hirtum. — A native of Central Europe. Rosettes 1–1½ in. in diameter, covered with soft glandular down, and fringed on the margins, outer ones faintly tinted with red. Flowers in June, pale yellow, on densely hairy stems 6–9 in. high.

Culture &c. as above.

S. Hueffeli.—A native of S.E. Europe, with rosettes 1½–2 in. in diameter. Leaves tinted with bright red-brown on the upper half, and margins fringed with stiff hairs. Flowers in August, straw-yellow with bright red-brown calyx when old. Flowering stems 6–8 in. high, very downy, with reddish-brown leaves ¾–1 in. long.

Culture &c. as above.

S. Lamottei. — A native of Central France. Rosettes 3–4 in. in diameter, smooth, ciliated, faintly tipped with reddish-brown. Flowers in summer, 1 in. across, pale pink, with bright purple filaments, on stems 1 ft. high.

Culture &c. as above.

S. mettenianum.—An Alpine Houseleek with medium-sized rosettes of ciliated tapering leaves which assume a reddish tint, especially on the upper surface, in autumn. The flower stems are 4–6 in. high with rosy-white blossoms produced during the greater portion of the summer and autumn months.

Culture &c. as above.

S. Moggridgei.—Native of the Alps. Rosettes 2 in. across, green, smooth, with minutely ciliated margins, the stem leaves pale green and reddish. Flowers in September, ¾ in. across, red, on stout leafy stems 9 in. high.

Culture &c. as above.

S. montanum.—A Pyrenean species with dense rosettes over 1½ in. in diameter. Leaves downy and glandular, ciliated, dark green. Flowers in June, bright mauve-purple, about 1 in. across, on leafy stems 6 in. high.

Culture &c. as above.

S. Pittoni.—A native of the Alps with medium-sized rosettes of velvety downy leaves fringed with hairs, and having a purple blotch at the tips. The yellowish flowers are borne on stalks 3–6 in. high during the summer months.

Culture &c. as above.

S. Pomelli. — A native of the Alps. Rosettes 1½–2 in. in diameter. Leaves hairy on both surfaces, the outer ones tinged with red. Flowers in July, bright rosy-red, about 1 in. across, on densely hairy and leafy stems, 6–9 in. high.

Culture &c. as above.

S. ruthenicum.—A free-flowering Caucasian Houseleek with large rosettes of velvety downy leaves often fringed with silvery white hairs, and assuming a reddish hue in autumn. The rosy-white flowers are freely produced during the summer months on stems 6–9 in. high.

Culture &c. as above.

S. soboliferum (*Hen and Chickens Houseleek*). — An Austrian species with globose rosettes 1–1½ in. across, with numerous new ones attached by a thread-like stalk. Leaves minutely ciliated, the outer ones tinted with bright red-brown. Flowers in summer, pale yellow, about 1 in. across, on strong stems 6–9 in. long, quite hidden by the leaves.

Culture &c. as above.

S. tectorum (*Bullock's Eye; Common Houseleek; Jupiter's Beard; Seagreen*). — A well-known plant naturalised in but not a native of Britain. Rosettes 3–4 in. in diameter, pale green, ciliated, distinctly tipped with reddish-brown. Flowers in summer, ¾–1 in. across, pale red, keeled with deep red; filaments bright purple. Flower stems about 1 ft. high, densely hairy. The variety *rusticum* (also known as *S. Requieni*) is distinguished from the type by its broad rosettes of blue-green leaves.

Culture &c. as above.

S. Wulfeni. — A native of Central Europe. Rosettes 1½–2 in. in diameter. Leaves somewhat glaucous, tipped with reddish-brown, with hairy edges. Flowers in summer, pale yellow, about 1 in. across, with bright mauve-purple filaments. Flower stems 6–9 in. long, densely hairy and leafy.

Culture &c. as above.

XLII. DROSERACEÆ—Sundew Order

A curiously interesting order containing about 110 species of annual or perennial glandular herbs, chiefly remarkable for their fly-catching propensities. The flowers are hermaphrodite. Calyx 4–8- (rarely 8-) parted or with free sepals. Petals 5, usually hypogynous, free or united at the base. Stamens 4–20, hypogynous or perigynous.

Except in botanic gardens, plants of this order are rarely cultivated, and even then they are not always seen in a happy condition. Where there is a moist boggy corner in the rock garden, some of the Sundews like *Drosera rotundifolia* may be tried; also the Venus's Flytrap *Dionæa muscipula* from N. America, or *Drosophyllum lusitanicum* from Portugal; or during winter in cold frames in mossy and peaty soil.

XLIII. HAMAMELIDEÆ—Witch Hazel Order

A peculiar order containing 30 species of smooth or downy trees and shrubs, with usually alternate stalked leaves, simple entire or toothed, deciduous or persistent, stipulate. Flowers 1-sexed or hermaphrodite, usually united in dense heads. Calyx tube more or less adnate to the ovary; limb truncate or 5-lobed. Petals 4–8, rarely absent, perigynous or nearly epigynous, linear-spathulate or obovate, sometimes reduced to scales or deficient on one side. Stamens 4 or more, perigynous, usually inserted at the mouth of the calyx. Ovary inferior or half-inferior; styles awl-shaped, straight or recurved.

PARROTIA. — A genus with 2 species of trees or shrubs, having oblong or roundish deciduous crenate leaves, and large stipules. Calyx bell-shaped, with 5–7 persistent, leathery lobes. Petals none. Stamens 5–7. Styles 2.

P. persica (*Iron Tree*).—A beautiful small Persian tree about 10 ft. high, with ovate-oblong, deep green leaves which change to orange or yellow and crimson in autumn, and look very handsome. Flowers in February, chiefly conspicuous by the numerous crimson-tipped stamens.

Culture and Propagation. — Grown against a wall facing south or west, this tree is perfectly hardy, and thrives in ordinary good garden soil. It may be increased by layers in summer and autumn, or by seeds sown under glass.

FOTHERGILLA.—This genus contains only one species described below with the generic characters:—

F. alnifolia. — A pretty dwarf straggling deciduous shrub with crooked branches, 3-6 ft. high, native of N.E. America. Leaves obovate, obscurely or at the apex largely toothed, clothed with soft, starry down. Stipules twin, small. Flowers in April and May, white, sweet-scented, in dense spikes, before the leaves appear. Calyx tube bell-shaped, 5-7-toothed. Petals none. Stamens about 24. This species is now called *F. Gardeni.*

Among the varieties are *acuta,* with narrow, ovate acute leaves; *major,* with ovate-oblong leaves, somewhat lobed at the base; *obtusa,* leaves obovate, crenate at the top, downy beneath when young; *serotina,* leaves oblong-acute, crenately toothed at the top.

Culture and Propagation. — This shrub and its varieties flourish in sandy peat and loam, in warm and well-drained situations, and may be trained on a wall like the Parrotia. It may be increased by layering the branches in late summer or autumn, or by means of seeds sown as soon as ripe in cold frames, or in spring in the same way.

CORYLOPSIS. — A genus with 3 or 4 species of ornamental deciduous Hazel-like shrubs. Calyx tube 5-parted. Petals 5, obovate spoon-shaped. Stamens 5, alternating with 5 truncate scales.

Culture and Propagation. — These peculiar plants require the same treatment as the Witch Hazels belonging to the next genus *Hamamelis.* They thrive in rich sandy loam or well-drained good garden soil and may be increased by ayering the ripened shoots in autumn, or by sowing the seeds in cold frames when ripe, or in spring. The Corylopsis are valuable for their early-flowering properties in spring, and are quite as beautiful and useful when in blossom as the Witch Hazels.

C. himalayana.—A shrub about 6 ft. high, native of the Khasia Mts. and Bhotan. Leaves roundish ovate or acute, often lobed at the base, plaited, smooth above, silky or downy beneath. Flowers in March, yellow or white, in drooping racemes at the ends of the branches.

Culture &c. as above.

C. pauciflora. — A Japanese species resembling *C. spicata* in habit, the colour and scent of its flowers; it is, however, a dwarfer plant with smaller leaves and fewer flowers in a raceme produced in March and April.

Culture &c. as above.

C. spicata.—A pretty Japanese shrub 3–4 ft. high. Leaves long-stalked, acutely heart-shaped, strongly feather-veined and serrated, somewhat hoary beneath. Flowers in February, pale yellow, scented like Cowslips, and issuing singly from a greenish-yellow bract, in drooping racemes 2–3 in. long.

Culture &c. as above.

HAMAMELIS (Witch Hazel).—A genus with only a few species of deciduous shrubs or bushes. Leaves roundish, unequal at the base, crenate-toothed. Calyx 4-parted, persistent. Petals 4, elongated linear, persistent, or absent in the female flowers. Stamens 4, alternating with 4 scales. Styles 2, short.

Culture and Propagation. — The Witch Hazels thrive in a moist sandy loam and are very effective as winter-flowering shrubs when grown in masses or beds by themselves. They are increased by layers chiefly, but also from seeds sown when ripe in cold frames, or in spring; and by grafting on stocks of *H. virginica* raised from seeds.

H. arborea.—A pretty Japanese tree 15–20 ft. high. Flowers in winter from December to February, while the branches are still in a leafless state; petals twisted, clear, rich, primrose-yellow; calyx deep claret.

Culture &c. as above. This is one of the most charming and conspicuous flowering shrubs in bloom during the dull months of the year. Its peculiarly twisted yellow flowers can be seen for a great distance, especially if several plants are grown in a bold group. They require but very little pruning; just cutting out any old or useless branches after flowering is over being sufficient. If the ground beneath is carpeted with Snowdrops, Scillas, Crocuses, Eranthis hyemalis &c. the bareness will be hidden and a good effect produced.

H. japonica.—Another Japanese shrub smaller than *H. arborea*, and with lemon-yellow flowers. It resembles *H. virginica* but differs in having larger flowers with dull purple calyx lobes.

Culture &c. as above.

H. mollis.—A pretty Chinese Witch Hazel of recent introduction. It has leaves much larger than the other Asiatic species, being 4–5 in. long and 2½–3½ in. wide, and also covered with a soft felt-like down on the under surface. The flowers appear in January and February and are borne on the leafless twigs. They resemble those of *H. arborea*, but are of a brighter yellow, although the petals are not so twisted.

Culture &c. as above.

H. virginica.—A N. American shrub about 6 ft. high, with obovate, sharply toothed leaves on short stalks. Flowers from October to February, rich yellow, in great profusion, on the leafless branches.

Culture &c. as above.

H. zuccariniana.—This is botanically only a variety of *H. japonica*, but very distinct from a garden point of view. It is very free-flowering, with pale yellow petals and a greenish-brown calyx.

Culture &c. as above.

LOROPETALUM.—A genus containing only the species described below with generic characters:—

L. chinense.—An ornamental evergreen shrub about 4 ft. high, native of the Khasia Mts. to China. Leaves dark green, alternate, oblong, entire, nerved beneath. Stipules membranaceous, deciduous. Flowers in autumn, white, 6–8 in a crowded head at the ends of the branches. Calyx tube 4-cleft. Petals 4, linear-elongated, somewhat twisted. Stamens 4, epigynous. Ovary half-superior; styles 2, awl-shaped.

Culture and Propagation. — This species thrives in light rich soil, and may be increased by seeds sown in cold frames when ripe or in spring; by cuttings of the half-ripened shoots in sandy soil under a handlight; or by layers in the autumn.

LIQUIDAMBAR.—A genus containing 4 species of ornamental, balsam-bearing, deciduous trees, with alternate, slender-stalked, palmately lobed, Maple-like glandulose-serrate leaves. Flowers in small heads usually 1-sexed; very rarely somewhat hermaphrodite; male flowers often in racemes, without calyx and corolla. Stamens clustered, shortly stalked; females solitary, with a confluent calyx, and no petals, surrounded by scales.

Culture and Propagation. — Liquidambars like a moist loamy soil and somewhat sheltered situations. New plants may be obtained from layers made in autumn and allowed to remain for about 12 months before detaching. Seeds which have to be imported) take a very long time—perhaps 12 months—to germinate, but soaking in warm water may facilitate the process. When the young plants are 6-9 in. high, they may be planted out in mild showery weather in spring.

L. orientalis (*L. imberbe*).—A large, slow-growing bush 10-20 ft. high, native of the Levant, with usually palmately 5-lobed, smooth leaves resembling some of the Maples.

Culture &c. as above.

L. styraciflua (*Sweet Gum*). — A beautiful N. American Maple-like tree 80-50 ft. high in a wild state. Leaves palmately lobed, with the sinuses at the base of the veins, hairy. Flowers in spring, greenish-yellow.

Culture &c. as above.

XLIV. HALORAGEÆ

A natural order containing about 80 species of herbs or usually perennial aquatic or terrestrial undershrubs. Leaves opposite, alternate, or whorled, simple, entire or toothed, the submerged ones often pectinately pinnatifid. Stipules none, or adnate to the leafstalk as in *Gunnera*. Flowers usually axillary, solitary or clustered, sometimes in a raceme, spike, or panicle, or corymbose; hermaphrodite or 1-sexed, often minute, frequently incomplete. Calyx lobes and petals 2, 4, or none, the latter concave, deciduous, valvate or imbricated at the margins. Stamens 2-8, rarely 1 or 3, large, with short filaments. Ovary ovoid, oblong, or shortly cylindrical, flattened or 2-8-angled or ribbed, rarely 2-4-winged. Styles 1-4, with papillose or feathery stigmas.

GUNNERA (PRICKLY RHUBARB).—A genus containing 11 species of scapigerous perennial herbs with large, stalked, ovate or roundish heart-shaped, simple or lobed, crenate, thick, leathery, often wrinkled leaves, all springing from the creeping rhizome. Flowers greenish, minute, in dense spikes or branched panicles.

Culture and Propagation.—Gunneras thrive in rich moist loam and are effective when judiciously planted in sunny places on the edges of lakes, streams &c., where they can be sheltered by the surrounding vegetation from the violent winds. The huge Rhubarb-like leaves die down on the approach of winter. While dormant the rootstocks are best covered over with dry leaves until the spring, when the covering may be removed, so as not to weaken the young growths, although in mild winters this precaution is scarcely necessary. The old leaves themselves make excellent coverings for the crowns. Gunneras are increased by dividing the rootstock or rather by detaching the thick bud-like shoots which form all round the base. Each shoot should be carefully planted in light rich soil in early autumn or in spring, and if started under the protection of cold frames so much the better.

Seeds may also be sown when ripe in cold frames or in gentle heat in spring, but it is rather a tedious process obtaining plants in this way as a rule. When well germinated the seedlings should be carefully pricked out, and it is best to grow them on in cold frames until they have become large sturdy plants. The following species are best known:—

G. manicata.—A noble-looking plant from the frosty regions of South Brazil. Leaves 4-7½ ft. in diameter, roundish heart-shaped and deeply lobed, and borne on stout stalks 4-6 ft. high.

Culture &c. as above. This species is perfectly hardy as far north as Aberdeen, with a slight protection of leaves in severe winters.

G. scabra. — A splendid Chilian species, with leaves 4–7 ft. across, borne on stout, prickly stalks 8–6 ft. long. Flowers reddish, small, very numerous, in a large, erect, club-shaped spike. A fine plant for sheltered places on the lawn or in grass. I saw a splendid specimen of this species in a garden at Clovelly a few years ago, and it must have been about 16 or 17 ft. in diameter then and about 10 ft. high, although I believe it was sheltered by a shrubbery on every side except the north.

Culture &c. as above.

XLV. MYRTACEÆ—Myrtle Order

A large order containing 76 genera and about 1800 species of trees, shrubs, or undershrubs, very few of which unfortunately are hardy in our climate. Leaves simple, entire, or rarely obscurely crenate-serrate, opposite or alternate. Flowers regular or nearly so, hermaphrodite, or polygamously abortive. Calyx lobes 4–5, rarely 6–8 or 3. Petals 4–5, rarely 6, or fewer or none by abortion. Stamens numerous. Ovary inferior, rarely half-superior.

LEPTOSPERMUM.—A genus containing about 25 species of smooth or silky-haired small trees or shrubs, with small alternate rigid leaves. Flowers white, often polygamous, borne in twos or threes at the ends of the shoots, or solitary in the axils of the leaves. Calyx tube more or less broadly bell-shaped with 5 herbaceous or membranous segments. Petals 5, spreading. Stamens numerous, free.

Culture and Propagation. — Leptospermums are chiefly met with in botanic gardens, and are then usually grown in cool greenhouses. *L. scoparium*, however, described below, flowers profusely at Belvoir Castle, Grantham, the seat of the Duke of Rutland, and Mr. Divers says it was quite uninjured by 12° frost in January. It requires to be planted in a warm corner, and enjoys a soil composed of peat loam and sand in about equal proportions. Cuttings of the shoots may be rooted during the summer months under a handglass. Seeds, if obtainable, may also be raised in gentle heat in spring.

L. lanigerum.—A beautiful Australian shrub 8–6 ft. high with silky-haired obovate leaves about ½ in. long. The beautiful white starry flowers, ¾ in. across, with roundish petals, appear from July to September and wreathe the branches for about 6 in. Their general appearance and colour strongly remind one of the flowers of *Saxifraga burseriana* (p. 418).

Culture &c. as above. This species has been found perfectly hardy in the open air in various parts of the United Kingdom, notably in the north of Ireland and in Lancashire. It is a shrub that is well worth growing, and although it was first introduced to cultivation as long ago as 1774 it is still practically unknown outside botanic gardens.

L. scoparium.—A beautiful New Zealand shrub 4–5 ft. high, with ovate mucronate leaves, which when rubbed between the hands give off a pleasant and fragrant odour. It produces masses of reddish-lilac flowers in January and February, about ½–¾ in. across, which are particularly welcome at this season of the year out of doors.

Culture &c. as above.

EUCALYPTUS (Gum Tree).—A genus containing over 100 species of mostly Australian trees, some of which attain a height of over 400 ft. in their native country. They are recognised by their entire leathery often glaucous leaves, which in the young trees are opposite, becoming alternate on the same trees with age, and variable in shape. Peduncles axillary or bearing 8–15 flowers in an umbel rarely with only one flower. Calyx-tube pear-shaped or bell-shaped, truncate at the apex, entire or remotely 4-toothed. Petals enclosed in a leathery calyptra, or top-shaped capsule opening at the top. Stamens numerous, free.

Culture and Propagation.—Only comparatively few species of Eucalyptus are grown in this country, and these chiefly for sub-tropical gardening during the summer months. *E. globulus* is the most popular species for this purpose owing to its graceful habit and its beautiful glaucous, ovate-lance-shaped, curved leaves, which look beautiful waving in the breeze.

In the mildest parts of the south of England and Ireland some of the Eucalypti may live for years and attain a goodly size, but in less favoured parts they will not survive the winter. For subtropical bedding purposes, the imported seeds should be sown about August. They sprout freely, and the seedlings may be grown on during the winter in a cool greenhouse or cold frame. By this means they will be much larger and stronger for planting out in May or June than plants obtained from seeds sown in spring. The following are some of the best kinds for cultivation in the open air :—

E. coccifera.—This is a native of Tasmania and in the mildest parts of the kingdom it will form a small tree recognisable by its blue-green appearance. The leaves are mostly ovate lance-shaped, falcate, more or less tapering to a point, and from 4 to 6 in. long.

Culture &c. as above.

E. Gunni—the *Cider Tree* of Tasmania—is perhaps the hardiest of all the Eucalypti for this country. For several years a tree of it grew in Kew Gardens and reached a height of about 80 ft., but it was killed at last by the winter of 1894-5. It forms a bush-like tree, and the branches are furnished with ovate lance-shaped or elliptic leaves 1½–2½ in. long.

Culture &c. as above.

E. urnigera. — This is another Tasmanian species which has been proved more or less hardy in the mildest parts of the kingdom in ordinary winters. It has dull green narrow lance-shaped acute leathery leaves 3–4 in. long, borne on twiggy branches with olive-green bark. At Whittinghame Gardens, Prestonkirk, N.B., there is a tree of this species which in 1887 was 60 ft. high, although it had been cut down to the ground by frost in 1860.

Mr. John Garrett, the gardener at Whittinghame, writes in reference to this particular plant :—'The tree is still in vigorous health. Its height is now (1900) 75 ft. and girth of main trunk 12 ft. 7 in.

'I have raised numerous seedlings from it. The first I raised was sown in September 1887, one of which is now 38½ feet high, and stem 1 ft. 10 in. This tree was twice transplanted, or it would doubtless have been much larger. We have planted quantities of it out in the woods also. With regard to the variety, I cannot say positively what it is. Authorities have differed so much regarding it. For example, the late Mr. Bentham, and the late Professor Balfour, of Edinburgh Botanic Gardens, considered it to be *E. viminalis*. Sir J. Hooker names it *E. urnigera*, and Baron Müller called it *E. Gunni*. I have grown *E. Gunni* (true variety) here also, and must say that it resembles *E. Whittinghamii* more than any other sort I have seen, and yet there is the difference that while the leaves of Gunni are opposite or nearly so, those of Whittinghamii are distinctly alternate, and have each a stalk of considerable length. I have also raised plants of *E. urnigera*, but could see no resemblance here whatever. In fact, the sorts are totally distinct. I have tried a great many sorts here, including *E. coccifera*, and had them up to about 18 feet in height, but all were killed in the spring of 1895, except our own variety, which was almost uninjured. One other variety was killed to about 2 feet from the ground, viz. *E. vernicosa*, which broke away again, and is now a nice plant about 10 ft. high. My own opinion is that *E. Whittinghamii* is a natural hybrid. The seed was originally brought from Australia by Lord Salisbury.'

Culture &c. as above.

MYRTUS (Myrtle). — A genus containing over 100 species of smooth, woolly, or downy shrubs, with opposite feather-veined leaves. Calyx lobes and petals 4–5. Stamens numerous, free. Ovary free. Fruit a berry.

M. communis (*Common Myrtle*).—A native of S. Europe 3–10 ft. high, with ovate, or lanceolate acute, deep green, shining leaves. Flowers in July, white, having the numerous golden-knobbed stamens much protruding. There are many varieties of the common Myrtle known as the Dutch, Italian, Roman, Rosemary or Thyme-leaved, Box-leaved &c., all beautiful and fragrant.

Culture and Propagation. — Except in the mildest parts of the country, the Myrtle requires the shelter of a wall. It likes a rich loamy soil with leaf mould, and during the summer months should not want for plenty of water. A good syringing every evening is very beneficial and gives the plants a beautiful fresh appearance and induces new growth. Sometimes the Myrtle is grown in pots, and kept in ordinary living rooms during the winter, with an occasional watering and a sponging of the foliage with tepid water.

The Myrtle may be increased by cuttings of the ripe or almost ripe shoots inserted in sandy soil under a glass, or the lower branches may be layered in the autumn and detached when well-rooted the following year. The seeds when obtainable may also be sown as soon as ripe in cold frames, or better still in gentle bottom heat.

M. Ugni (*Eugenia Ugni*).—A beautiful Chilian shrub 4–6 ft. high with deep green shining ovate acute leaves, the margins of which are slightly reflexed. Flowers in summer, white, with numerous protruding stamens, and succeeded by roundish red or black berries, which have a pleasant taste and an agreeable aroma.

Culture &c. as above for the Common Myrtle.

XLVI. MELASTOMACEÆ

A large order containing 134 genera and 1,800 species, consisting chiefly of erect trees and shrubs, with opposite, exstipulate, paralled-veined leaves, and flowers in panicles, spikes, cymes or corymbs. The genus *Rhexia* described below is the only representative of the order hardy out of doors in the British Isles.

RHEXIA. — A genus including 7 species of erect branching herbs or undershrubs. Leaves oblong, shortly stalked, 3-nerved, entire or bristly serrulate. Flowers solitary or cymose, regular, hermaphrodite. Calyx tube oblong, bell-shaped, 4-lobed. Petals 4, obovate. Stamens 8, anthers with a pore at the apex, and a spur at the base. Ovary free, smooth, 4-celled.

Culture and Propagation.—Rhexias thrive in good peaty soil, and may be increased by dividing the rootstocks in early autumn or in spring. This operation however should not be performed more often than necessary, as the plants do not bear disturbance very well. In any case, only large clumps should be divided, and that as carefully as possible. They are excellent for massing in the front of borders, flower-beds &c., with taller plants as a background. They are all natives of Eastern N. America.

R. ciliosa. — A species 1–1½ ft. high, with smooth, 4-angled stems. Leaves about 1 in. long, ovate, 3-ribbed, and bristly above. Flowers in July and August, purple, 1–1½ in. across, few on a leafy cyme.

Culture &c. as above.

R. mariana.—A bristly plant 1–2 ft. high, with round or 6-angled stems. Leaves lance-shaped acute, bristly, serrate, 3-ribbed. Flowers from July to September, purple, 1½–2 in. across, hairy outside.

Culture &c. as above. Owing to the brilliant crimson-scarlet tint assumed by the foliage of this species in autumn it should be planted in bold masses to secure a fine effect at that season.

R. virginica (*Deer Grass; Meadow Beauty*).—A bristly species 6–12 in. high, with 4-angled stems. Leaves ovate and ovate-lance-shaped, somewhat acute, sessile, bristly serrate, 3–5-nerved and covered with short bristly hairs. Flowers in July and August, bright purple or red, with a cluster of yellow-spurred stamens in the centre.

Culture &c. as above.

XLVII. LYTHRARIEÆ—Loosestrife Order

This order contains about 250 species of trees, shrubs, or herbs of varied habit, often with 4-angled branches. Leaves usually opposite exstipulate. Flowers usually hermaphrodite, regular or rarely irregular. Calyx usually free, persistent, tubular, or bell-shaped, 3–12-lobed or toothed, valvate.

Petals as many as the lobes or teeth of the calyx, rarely fewer or none, often crumpled and clawed. Stamens definite or rarely numerous.

CUPHEA (Cigar Plant).—A genus with 90 species of herbs or small shrubs, often clammy and smooth-stemmed. Leaves opposite or whorled, rarely alternate. Calyx and tube elongated, ribbed, coloured, produced below into a spur, with 6 primary teeth, and 6 secondary smaller ones. Petals usually 6, clawed, the two upper ones usually larger. Stamens 11, the upper one missing, enclosed or protruding.

Culture and Propagation.—Cupheas are not strictly hardy plants, but as they are used so much for beds and borders in summer, they deserve notice here. They are increased by cuttings in brisk bottom heat in spring, or better still, seed may be sown in January or February in heat, and pricked out and potted on until planting-out time at the end of May. If grown in rich sandy soil they will be good plants by that time. The kinds mentioned below are best known. They should be planted in masses, each plant being 9 to 12 in. or thereabouts apart. In this way they will assist each other in producing a glowing effect.

C. eminens (*C. jorullensis*).—A greyish-green or whitish-looking Mexican plant about 2 ft. high with oblong lance-shaped acute leaves covered with down. The numerous flowers are borne in long terminal spikes in summer, and the velvety hairy calyx is of a bright orange-red colour.

Culture &c. as above.

C. ignea (*C. platycentra*).—A native of Mexico about 1 ft. high, with deep ruby stems, lance-shaped-pointed leaves, and bright scarlet, cylindrical flowers in July and August, with a black and white expanded limb, the whole flower resembling a miniature cigar with an ashy tip.

Culture &c. as above.

C. lanceolata. — A pretty branching Mexican annual 12-18 in. high, with alternate or opposite ovate lance-shaped downy leaves. The flowers appear in summer, and vary a good deal in colour from bright rose to purple or carmine and scarlet, the two upper and larger petals sometimes having a deep purple blotch at the base. There is a dwarf variety called *nana*, which does not often exceed 9-12 in. in height.

Culture &c. as above.

C. miniata. — A Mexican perennial about 2 ft. high, with ovate-pointed leaves covered with white bristles. Flowers from June to September, pale vermilion. The variety *Llavea* has larger leaves, and bright purple, cylindrical, hairy tubes, with crumpled oblong petals, and woolly stamens.

Culture &c. as above.

C. silenoides. — A Mexican annual 12-18 in. high, closely resembling *C. lanceolata*. The conspicuous flowers appear from June to October, and have a rosy-purple calyx with deeper coloured stripes, and purple-brown petals, while the throat of the calyx tube is furnished with rosy-white hairs.

Culture &c. as above.

C. strigillosa (*C. cyanea*).—A much-branched Mexican species 12-18 in. high, with downy oval oblong acute leaves, and clusters of yellow and red flowers in summer. The clammy calyx is red at the base, and yellowish at the apex, while the petals are purple-red.

Culture &c. as above.

C. Zimapani. — A beautiful Mexican species about 2 ft. high. Flowers in autumn, deep rich purple, with a paler border.

Culture &c. as above.

LYTHRUM (Loosestrife). — A genus containing 12 species of smooth or downy herbs or undershrubs, with 4-angled stems. Leaves opposite, rarely whorled or alternate. Flowers in the axils of the upper leaves, solitary or cymose. Calyx tube cylindrical, 8-12-ribbed, straight, 4-6-toothed. Petals 4-6, obovate, sometimes unequal or none. Stamens 8-12, rarely fewer.

Culture and Propagation.—Lythrums are easily grown in ordinary garden soil, and may be increased by division in autumn or spring. If left undisturbed in a few years they spread over large areas and stifle other plants near them with their rather rank growth. The seeds are shed, and often masses of seedlings may be seen shooting up in spring all around the parent plant. It is necessary therefore to keep the Loosestrifes within bounds in the rougher parts of the garden or by the banks of streams, lakes, ponds &c.

L. alatum.—A pretty half-shrubby N. American species 1–4 ft. high, with twiggy 4-angled branches. Leaves ovate oblong acute, rather lobed at the base, sessile, or nearly so. Flowers in summer and autumn, beautiful purple.

Culture &c. as above.

L. Salicaria (*Common Purple Loosestrife*).—A native plant 2–5 ft. high, with lanceolate leaves lobed at the base. Flowers in July, reddish-purple, in whorled leafy spikes, almost sessile, petals 6–7. There are two fine varieties, *roseum* and *superbum*.

Culture &c. as above. This handsome plant is excellent at the sides of streams, ponds &c.

L. virgatum.—A native of Siberia 2–3 ft. high, with lance-shaped leaves, narrowed towards the base. Flowers in summer, purple, in threes, distinctly stalked.

Culture &c. as above.

PUNICA (POMEGRANATE).—A genus with only 1 species, here described with the generic characters:—

P. Granatum.—A handsome deciduous tree 15–30 ft. high, native of Cabul and Persia, with oblong or lance-shaped entire leaves. Flowers from June to September, red, 2–5 together, almost sessile, near the ends of the branches. Calyx persistent, thick, fleshy, 5–7-lobed. Petals 5–7 inserted in the throat of the calyx, lance-shaped, crumpled. Stamens several. The double variety *flore pleno* is handsome; and *nana* is a much smaller plant than the type.

The imported fruit of the Pomegranate is well known. It is remarkable in being composed of 2 sets of carpels, one above the other, and the seeds are embedded in a pellucid pulp.

Culture and Propagation.—Only in favoured spots or on sheltered walls does the Pomegranate produce its flowers in this country, and very seldom its leathery skinned fruits. It thrives in a rich loamy soil, and when not trained against a south wall, or grown as a bush, it is sometimes treated as a pot or tub plant like Oranges, and kept in a greenhouse during the winter. It may be increased from seeds sown in gentle heat; by cuttings of the half-ripened shoots in gentle heat under a bell-glass; or by layers, suckers, or grafting, the latter process being reserved for fine coloured varieties.

XLVIII. ONAGRARIEÆ—Evening Primrose Order

An order with over 20 genera and 300 species of annual or perennial scentless herbs, rarely shrubs, or trees. Leaves opposite and alternate, usually entire, dentate or serrate. Stipules none. Flowers usually hermaphrodite, regular, axillary and solitary, or spicate, or racemose, near the ends of the branches. Calyx-tube adnate to the ovary; limb, with usually 2–4 large, valvate, frequently coloured lobes. Petals often 2–4, rarely none, fugacious, twisted. Stamens 1-8, very rarely 5, 6, or 12. Ovary inferior, 1–6 very often 4-celled. Fruit various, capsular or berry-like.

EPILOBIUM (WILLOW HERB).—A genus with 50 species of erect, decumbent, or creeping herbs or undershrubs, having alternate and opposite, entire or toothed leaves. Calyx tube slender, scarcely produced beyond the ovary, linear, 4-angled or roundish; limb 4-parted, deciduous. Petals 4, obovate or obcordate, erect or spreading. Stamens 8, alternately short and long. Ovary 4-celled; style thread-like, with an oblique club-shaped or 4-lobed stigma. Capsule 4-angled, opening between the cells.

Culture and Propagation. — The kinds mentioned below are the only ones of any garden value. They thrive in any garden soil, and in any situation, and require to be kept in check, or they will soon choke choicer plants in a border or shrubbery. They may also be used with effect near water. Easily increased by seeds sown in the open border as soon as ripe or in spring, covering the seed beds with lights in case of severe weather; or by division of the rootstocks in autumn or in spring. The following are a few of the best kinds:—

E. angustifolium (*French Willow* or *Rose Bay*). — A vigorous and rapidly spreading British plant 3–6 ft. high, with lance-shaped, wavy, Willow-like leaves, and spiked racemes of crimson flowers in July. There is a charming pure white variety.

Culture &c. as above.

E. Dodonæi (*E. Halleri*). — A European species 1 ft. high, with linear obscurely toothed leaves. Flowers in July, deep rose, large, crowded near the top of the branches.

Culture &c. as above.

E. hirsutum (*Codlins and Cream*). A British and European species 3–5 ft. high, covered with a soft clammy down, and exhaling a peculiar acid scent. Leaves opposite below, alternate above, ovate lance-shaped, hairy, toothed, half stem-clasping. Flowers in July, usually pale pink, sometimes white.

Culture &c. as above. This species naturally likes moist places, and may be used in masses at the edges of streams, ponds &c. for effect in the same way as the purple Loosestrife.

E. luteum.—A pretty N. American Willow Herb 6–9 in. high, with slender stems and broad, bright green leaves. The pale yellow flowers about an inch across appear in summer in clusters at the tips of the shoots.

Culture &c. as above. This species should be planted in a warm position sheltered from the north and east winds.

E. obcordatum.—A charming Californian species, low-growing, and suitable for moist well-drained parts of the rock garden. Leaves opposite, ovate, stalkless, glaucous, ½–1 in. long. Flowers in summer, bright rose-purple, large.

Culture &c. as above.

E. rosmarinifolium (*E. angustissimum*). — A pretty European species 2 ft. high, with linear obscurely toothed leaves like the Rosemary. Flowers in July, red, crowded near the top of the branches.

Culture &c. as above. This species makes elegant tufts and produces a grand effect when grown in masses. Owing to its comparative dwarfness it may be utilised for the decoration of the rock garden, and grown in light rich sandy soil.

ZAUSCHNERIA (Californian Fuchsia; Humming Bird's Trumpet).—A genus with only one species:—

Z. californica. — A handsome downy branched shrub about 1 ft. high, native of California and Mexico. Leaves sessile, linear lance-shaped, downy, entire or finely toothed, lower ones opposite; upper ones alternate. Flowers in summer and autumn, bright red, in loose drooping spikes at the ends of the branches. Calyx tube linear, 4-angled, roundish or inflated at the base. Petals 4, obovate, 2-lobed. Stamens 8, alternately shorter. Ovary 4-celled; style with a 4-lobed stigma. Capsule linear, 4-angled.

Culture and Propagation. — In bleak localities this plant requires protection of the rootstock in winter by ashes, leaves &c., but it grows well in warm sheltered positions. The plants may be increased by sowing seeds in March in gentle heat, or by dividing the rootstocks about the same time. Cuttings of the non-flowering shoots may also be inserted in sandy soil under handlights in autumn, and again in spring, and this method may be adopted for perpetuating the finest coloured varieties. Of these there appear to be several, among them one named *mexicana*, which seems to be more hairy than the type, and with more brilliant flowers. The variety *latifolia* has broader whitish hairy leaves, and rather smaller flowers with a dull red calyx. This species has been found to flourish not only in good rich garden soil, but also in stiff clay, which was baked and cracked by the summer sun. Where the poor shy blooming varieties exist they are sure to cause disappointment, but there is nothing so fine as a good clump of the best forms.

CLARKIA.—A genus having a few species of smooth or hairy branching annuals, with alternate linear or lance-shaped, entire or toothed leaves. Flowers axillary, solitary, or in terminal racemes. Calyx tube linear, 4-angled; limb 4-parted. Petals 4-clawed, dilated, entire, or 3-lobed. Stamens 8.

Culture and Propagation. — Clarkias are very showy plants in the border and grow well in ordinary garden soil. They may be raised from seeds sown out of doors either in spring or autumn, and when planted out to flower a distance of about a foot should be between them. They produce charming masses of colour in the flower border during the summer and autumn months.

C. elegans. — A pretty Californian annual with purplish stems, 1½ to 2 ft. high. Leaves ovate lance-shaped, smooth, dentate. Flowers in summer, rich crimson, with kidney-shaped, long-clawed petals. There are several varieties including pure white, rose &c. *Purple King* and *Salmon Queen* are two of the best double-flowered forms.

Culture &c. as above.

C. pulchella.—An elegant N. American annual, 1½-2 ft. high, with linear smoothish leaves, and large purple flowers in summer, with deeply 3-lobed petals. There are many single and double varieties of this species. The variety *alba* has white flowers. The one known as *integripetala* has entire instead of 3-lobed petals. There is also a dwarf *Tom Thumb* strain, the plants of which are shorter and more compact than the type.

Culture &c. as above.

ŒNOTHERA (Evening Primrose). A genus containing about 100 species of herbs or small shrubs of variable habit. Leaves alternate, membranous, sessile or stalked, entire, toothed, lobed, or pinnatifid. Flowers axillary, solitary, sessile or stalked. Calyx tube linear or club-shaped, 4-angled, produced beyond the ovary, 4-lobed. Petals 4, obovate or obcordate, barely clawed. Stamens 8, equal or alternately shorter. Stigma 4-lobed. Capsule membranous, leathery or woody, linear oblong or clavate, round, 4- or many angled and ribbed, or broadly 4-winged.

Culture and Propagation. — From June till the end of autumn Œnotheras are among the most showy of hardy flowers, and they thrive in any fairly good sandy soil. They may be used in a variety of ways, in borders or shrubberies, mixed with other plants, or in beds by themselves, always favouring a warm sunny position. The annual and biennial kinds may be increased by sowing seeds in the open border in spring for flowering the same year; or in cold frames in autumn for blooming the following year. In the case of perennial kinds, cuttings may be put in a cold frame in autumn, and protected from frosts during the winter months; but they may also be raised from seeds in the same way as the annuals and biennials, and cuttings of the young shoots may also be inserted in sandy soil under glass in spring. Most of the kinds however are so easily raised from seeds that it is the better means of propagation on the whole.

The genus *Godetia* is now included with *Œnothera.*

Œ. amœna (*Œ. Lindleyi*).—An annual 1-2 ft. high from N.W. America, with entire linear lance-shaped leaves. Flowers in summer, rose, with a crimson spot on each petal. The variety *rubicunda* from California has lilac-purple flowers with a deep blotch at the base of each petal. It is known as *Godetia rubicunda* also, and many fine varieties have been obtained from it, including a dwarf strain called *Tom Thumb.* The one called *Bijou*, having white flowers spotted with red at the base of the petals, grows about 9 in. high and is very free-flowering.

Culture &c. as above. Increased by seeds sown in spring or autumn.

Œ. biennis (*Common Evening Primrose*).—A N. American biennial 2-4 ft. high, with a rosette of lower leaves, oblong-lance-shaped passing upwards into ovate-lance-shaped toothed and downy. Flowers in summer and autumn, beautiful primrose-yellow, about 3 in. across, fragrant, and at their best in the evening. The variety *Lamarckiana* (or *grandiflora*) has finer and larger flowers and is a fine border plant.

Culture &c. as above. This species once introduced to a garden is with difficulty eradicated, as it seeds freely and increases rapidly. Confined in masses to rougher parts of the garden, it is a plant difficult to surpass for its soft yet brilliant yellow colouring.

Œ. bistorta. — A Californian annual with somewhat decumbent stems and lance-shaped leaves. Flowers in summer, yellow, with small deep blood-red spots at the base. Fruit 1½-2 in. long, twisting when ripe. *Veitchiana* is an improved form.

Culture &c. as above. Increased by seeds sown in autumn in cold frames and pricked out in spring; or by sowing in the open border in April, or in gentle heat in March, afterwards transplanting the seedlings at the end of May to the open border.

Œ. californica.—A Californian perennial about 2 ft. high, with oblong-lance-shaped leaves. Flowers in summer, 1½–3 in. across, varying from white to pale pink, with a yellowish centre, very fragrant and opening in the evening.
Culture &c. as above.

Œ. crassicaulis. — A beautiful N. American biennial 1½–2 ft. high, forming tufts a yard through in the course of the season's growth. Leaves lance-shaped acute, unequally toothed and wavy, green with a white midrib. The flowers appear from July to October and are 3–4 in. across, pure white, tinted with yellow in the centre, and becoming faintly flushed with rose as they grow old.
Culture &c. as above. Increased by seeds sown in cold frames in autumn, and transplanting the seedlings in spring.

Œ. Drummondi.—An annual or biennial Evening Primrose, native of Texas. It grows 1½–2 ft. high, and has slightly downy trailing stems, and grey-green oval lance-shaped wavy leaves. The pale yellow blossoms appear from June to October and have obcordate petals. The variety *nana* is a dwarf free-flowering plant. There is a form of it called *alba*, the flowers of which however are pale creamy yellow and not white, as one would imagine from the name.
Culture &c. as above. Raised from seeds sown in autumn or spring.

Œ. eximia (*Œ. marginata*). — A handsome perennial 9–12 in. high, from the Rocky Mts. of Upper California. Leaves lance-shaped, downy. Flowers in July, white, 4 in. across, scented, with very long, slender calyx tubes. This species is also known as *Œ. cæspitosa.*
Culture &c. as above.

Œ. fruticosa. — A perennial 2–3 ft. high, native of the United States. Leaves 1–2 in. long, ovate-lance-shaped, finely toothed. Flowers from June to September, golden-yellow, with broad, obcordate, erose petals. The varieties *major* and *Youngi* may possibly be a little better than the type; *ambigua* has rather pale yellow flowers, at first in corymbs, afterwards in racemes.

Culture &c. as above. This species may be increased from seeds, and also by dividing the tufts in spring or early autumn. It is also known as *Œ. serotina.*

Œ. glauca.—A beautiful N. American smooth and glaucous perennial 1–2 ft. high, with ovate repandly-toothed leaves. Flowers from June to October, pale yellow, large, with obcordate, erose petals. The variety *Fraseri* from S. Carolina is a dwarfer form with brighter green oval lance-shaped leaves and deeper yellow flowers.
Culture &c. as above.

Œ. linearis.—A perennial 10–18 in. high, from the United States. Leaves linear or narrow lance-shaped, remotely toothed or entire. Flowers in summer, yellow, scarcely scented.
Culture &c. as above.

Œ. missouriensis.—A handsome N. American perennial with prostrate downy stems, entire, lance-shaped leaves, the edges and nerves of which are covered with white, silky down. Flowers from June to August, yellow, 4–5 in. across; petals broadly obcordate, calyx spotted with red. The variety *latifolia* or *macrocarpa* is a fine broad-leaved form.
Culture &c. as above. As this species often fails to ripen seeds it must be increased by dividing the tufts in mild weather in spring; or from cuttings of the young shoots inserted in sandy soil in gentle heat.

Œ. rosea.—A much-branched Mexican species about 1 ft. high, with oval lance-shaped toothed leaves, the lower ones of which are more or less lyrate. The flowers appear in May and June and continue up to October. They are among the smallest of the genus, and are usually more expanded in the evening and the early morning.
Culture &c. as above. Although really a perennial, this species may be raised from seeds sown annually in autumn or spring. It is not so striking as the other species, but may be used in sunny parts of the rockery.

Œ. speciosa. — A fine N. American perennial 2–3 ft. high, with lance-shaped, coarsely toothed leaves, downy beneath. Flowers from March to September, white, 3 in. or more across, becoming rosy with age. The drooping, cylindrical, pointed buds will expand if the flower stems are placed in water.

Culture &c. as above. When this species fails to ripen seed, as it does occasionally in unfavourable seasons, it may be increased by dividing the tufts in early autumn or spring. Cuttings of the roots about 1½–2 in. long will also produce plants if placed in light sandy soil in a gentle hotbed in spring.

Œ. taraxacifolia.—A beautiful Chilian biennial 6 in. high, with somewhat trailing stems. Leaves downy, interruptedly pinnate, Dandelion-like. Flowers in summer, white, with a narrow tube 6 in. or more long, becoming red with age, and at their best in the evening. Fruit borne in the axils of the leaves, pear-shaped and 4-winged.

Culture &c. as above. Increased by seeds sown in autumn in cold frames, or in the open border in April, or in gentle heat in March. A good plant for warm sunny banks in the rock garden.

Œ. tenella.—A pretty Chilian annual 6 9 in. high, with rather glaucous linear spoon-shaped leaves and purple flowers produced in June.

Culture &c. as above.

Œ. tetraptera. — A downy Mexican annual 9–12 in. high, with leaves pinnately cut into toothed lobes. The very fragrant flowers appear in July and August. They are 3–4 in. across, white at first, afterwards becoming tinged with rose, and opening best at early morn and eve.

Culture &c. as above. The seeds of this species are best sown in the open border in April and May where the plants are to bloom, afterwards thinning the seedlings out about a foot apart.

Œ. triloba. — A North American annual 3–6 in. high, with interruptedly pinnatifid toothed leaves. Flowers from May to September, pale yellow, sweet-scented in the evening; petals obovate, slightly 3-lobed.

Culture &c. as above.

Œ. vinosa (*Godetia vinosa*). — A Californian annual about 2 ft. high, with linear-oblong, smooth, slightly toothed leaves. Flowers in July and August, white tinted with purple.

Culture &c. as above.

Œ. Whitneyi (*Godetia grandiflora*). A pretty Californian annual 1–1½ ft. high, with oblong lance-shaped leaves. Flowers in summer, 3–4 in. across, rosy-red, blotched with crimson, numerous, crowded. *Concolor* (white), *flammea* (crimson), and *flammea striata* (crimson striped), *Lady Albemarle* (brilliant rose), *Duke of York* (scarlet), *Bridesmaid* (rose and white), *Duchess of Albany* (white), *gloriosa* (deep blood-red), *Fairy Queen* (white and crimson), *Mandarin* (sulphur-yellow) are a few of many fine forms raised from this species. There is also a dwarf compact form with double deep crimson flowers.

Culture &c. as above. Increased by seeds.

EUCHARIDIUM. — A genus with 2 or 3 species of Californian annuals, with alternate, ovate-lance-shaped or oblong entire leaves. Calyx tube linear, 4-angled, 4-parted, deciduous. Petals 4, clawed, 3-lobed or wedge-shaped obcordate, the middle lobe longer and much smaller than the other two. Stamens 4. Ovary 4-celled. Style filiform; stigma dilated, 2-4-lobed. Capsule linear-oblong, roundish.

Culture and Propagation. — These dwarf annuals about 9 in. high grow in ordinary soil, and to obtain the best results seeds should be sown in the open in early autumn to obtain flowers in early summer. Seeds may also be sown out of doors in March for autumn flowering.

E. Breweri. — An elegant annual, forming dwarf dense tufts. The short stems are furnished with oval or nearly linear oblong entire leaves. The red or lilac-purple flowers are borne in great profusion and almost hide the foliage.

Culture &c. as above.

E. concinnum. — This species also makes dwarf compact tufts 9–12 in. high and has rosy flowers; the variety *album* being white or faint blush. *E. grandiflorum*, with deep rosy-purple flowers, is regarded as a variety of *concinnum.*

Culture &c. as above.

FUCHSIA (Lady's Ear-Drops). — This well-known genus contains about 50 species of smooth or hairy small shrubs or trees, with opposite, alternate and whorled, entire or toothed leaves. Flowers usually drooping, solitary on axillary stalks, or sometimes in racemes or panicles at the tops of the branches. Calyx coloured, tube produced beyond the ovary, limb 4-lobed. Petals 4, convolute, or spreading, or reflexed. Stamens 8, with slender filaments, often protruding. Fruit a 4-celled pulpy berry.

Along the southern and western coasts the Fuchsia may be seen in all its beauty and vigour, and it is astonishing that such lovely flowering plants should not be more in favour in the flower garden. In less favoured localities than those referred to many kinds of Fuchsias will grow well, and although they may have their shrubby stems cut down during the winter like herbaceous plants, in spring new ones shoot forth with renewed vigour from the rootstock. It is probably owing to the numerous charming and tender varieties grown in greenhouses that many people have obtained the impression that all Fuchsias require indoor treatment. Such, however, is not the case, and the kinds described below will be found to grow very well out of doors, and add a unique charm to the flower border. In severe winters the roots may be covered with a little coco-nut fibre or ashes, to guard them from the frost.

Culture and Propagation.—Fuchsias thrive in rich sandy loam and leaf soil, but grow well in ordinary garden mould. They are easily increased by cuttings of the young shoots inserted in sandy soil under glass in spring. They root very soon, and may be put singly into pots and grown on until large enough for planting out. By just pinching out the tip of the main shoots, new branches are caused to develop, and in a short time a strong bushy plant is obtained. Fuchsias cannot have too much light and air to make them sturdy in growth, and water should be given freely, except in winter, when they will go for weeks without a drop.

Seeds are ripened freely on many kinds, and may be sown in autumn after being cleansed from the pulp surrounding them; or in spring, in pots or pans, under glass. Unless new varieties are required it is not worth while to sow seeds, as cuttings are much quicker and better.

Besides the natural species, all the florists' varieties are useful for planting out in the summer time, and those with bronze or variegated foliage and dwarf habit make effective groups by themselves or in the front of a mixed border.

F. coccinea.—A pretty Chilian bush, with slender, downy branches, 3–6 ft. high. Leaves bluntly ovate, toothed, on short hairy stalks, smoothish above, downy beneath. Flowers in summer; petals violet, obovate; sepals scarlet, purple at the base, oblong acute.

Culture &c. as above.

F. conica.—A vigorous Chilian species 3–6 ft. high, with scarlet sepals, and deep purple petals. Leaves 3–4 in a whorl, ovate flat, toothed, smooth; stalks downy.

Culture &c. as above.

F. corallina.—In the South and West of England this plant has produced thick stems to a height of 20 ft., and is useful for walls, or the sides of houses &c. Leaves opposite, or in whorls of 4 or 5, greenish-crimson above, dark crimson beneath; the young stems dark red. Flowers drooping; sepals crimson; petals dark plum-colour.

Culture &c. as above.

F. corymbiflora. — A Peruvian shrub 4–6 ft. high, with somewhat 4-angled branches, reddish and downy when young. Leaves large, opposite, oblong lance-shaped, almost entire, with a rosy midrib. Flowers in summer, scarlet, about 2 in. long, in drooping terminal clusters.

Culture &c. as above.

F. dependens. — A native of Chili, 2–4 ft. high. Leaves whorled, ovate-acute, toothed, slightly downy above, paler and more hairy beneath. Flowers in summer, in drooping leafy racemes, at the ends of the shoots; calyx soft scarlet; corolla deeper in colour.

Culture &c. as above.

F. globosa. — A fine Mexican shrub 5–6 ft. high. Leaves ovate-acute, small, toothed. Flowers from June to October, drooping, globular, sepals purplish-red; petals purplish-violet.

Culture &c. as above.

F. gracilis (*F. decussata*).—A graceful Mexican shrub 6–10 ft. high, with finely pubescent branches. Leaves opposite, on long stalks, smooth, distantly toothed. Flowers in summer and autumn, axillary, nodding; sepals scarlet, oblong acute; petals purple. There is a beautiful variegated form, with silvery foliage, not so hardy as the type. *Multiflora* is a free-flowering form, and *tenella* is a seedling.

Culture &c. as above.

F. macrostemma (*F. magellanica*).—A beautiful Chilian shrub 6–12 ft. high.

Leaves shortly stalked, 3 in a whorl, ovate acute, finely toothed. Flowers from July to October, axillary, nodding; calyx scarlet, with oblong-acute lobes, longer than the obovate, spreading petals. *F. conica*, *globosa*, *gracilis*, and *discolor* are probably only botanical varieties of this species, but from a garden point of view they are distinct enough.

Culture &c. as above.

F. Riccartoni. — This is one of the most graceful and hardy of Fuchsias. It is a garden hybrid from *F. globosa*, and was raised at Riccarton, near Edinburgh, about 1830. Its compact, twiggy branches are laden with bright red flowers during the summer and autumn. It stands severe winters well in many northern parts.

Culture &c. as above.

LOPEZIA.—A genus with about 6 species of smooth or downy branching erect herbs, with alternate leaves (or lower ones opposite), stalked and toothed. Flowers at the tips of the branches in racemes or corymbs. Calyx-tube with 4 linear lobes. Petals 4. Stamens 2, epigynous, one fertile, one sterile and petaloid. This is the chief peculiarity of the genus.

L. coronata.—An interesting Mexican annual 1½–2 ft. high, with ovate serrate leaves, and rose-purple flowers from July to September. *L. grandiflora* is a larger plant but not quite so hardy. It has orange-red flowers. The cut flower-spikes last a long time in water, and are thus valuable for bouquets &c.

Culture and Propagation.—Lopezias grow well in light soil and are increased by seeds sown in heat in March, and the seedlings planted out in May or the beginning of June. They are not very effective if planted singly, but grown in masses in the border they make a very good display. They require abundance of water during the season.

GAURA.—This genus contains about 20 species of smooth, downy, or hairy annual or perennial herbs, rarely bushes, all natives of the Southern United States and Mexico. Leaves alternate, sessile or stalked, entire, toothed or sinuate. Flowers sessile or stalked in racemose spikes. Calyx tube more or less obconical, 3–4-angled, 3–4-lobed. Petals 3–4. Stamens 6–8, declinate; filaments slender, with a scale-like appendage at the base. Fruit indehiscent, 3–4-angled, leathery or woody.

Culture and Propagation. — Gauras grow best on a light well-drained soil in sunny positions. They are most readily increased from seeds sown in spring indoors or out, and transferred to flowering positions when large enough. They like plenty of water during the season and look well grown in bold masses.

G. Lindheimeri. — An elegant plant 3–4½ ft. high, with ovate-lance-shaped toothed leaves, often spotted with reddish-purple, and becoming linear lance-shaped upwards on the branching stems. Flowers from June to October, pure white and rose, in numerous long, slender spikes.

Culture &c. as above. Although really a perennial it is best to raise this species from seeds every year and treat it as an annual.

G. biennis, with white flowers changing to red, and **G. parviflora**, with yellow flowers, are other species not so well known.

XLIX. LOASEÆ

An order of erect or twining herbs, rarely shrubs, with forked branches, without tendrils and often clothed with stinging hairs. Leaves opposite or alternate, entire, lobed, pinnatifid, or pinnate; stipules none. Flowers regular, hermaphrodite, solitary, racemose, or cymose, or capitate; peduncles often opposite the leaves. Calyx tube adnate to the ovary, often with spirally twisted ribs; lobes 4 or 5, imbricate or twisted, persistent. Petals 4–5, inserted on the throat of the calyx, sessile or clawed, flat or hooded; sometimes with petaloid scales alternating with the hooded petals; stamens usually numerous, often in clusters opposite the petals. Ovary usually inferior;

style filiform, entire, or 2–3-cleft. Capsule usually 1-celled with straight or twisted ribs.

MENTZELIA (including Bartonia). A genus containing about 80 species of annual, biennial, or perennial plants with alternate leaves. Calyx tube 4–5-lobed. Petals 5, lanceolate or spathulate, rarely oblong or obovate. Scales none. Stamens numerous, free or in clusters.

Culture and Propagation. — Mentzelias and Bartonias are showy plants when in bloom, and are worth a place in summer in the border. They grow easily in ordinary soil and may be raised from seeds sown in slight heat for planting out in May, or in the open in spring. The biennial species should be sown early in autumn in a cold frame, shifting the plants on into pots until spring, when they may be put outside. The annuals treated thus will bloom much earlier the following year. Some of the kinds however do not transplant very well, and are best raised from seeds sown in patches in the open border in April and May, and onwards until about the middle of June to secure a succession of blossom well into autumn.

M. albescens (*Bartonia albescens*).—A pretty Chilian annual or biennial 1–4 ft. high, with whitish shining stems and sinuately toothed leaves. Flowers in summer, pale yellow, with 10 petals.

Culture &c. as above.

M. bartonioides (*Eucnide* and *Microsperma bartonioides*).—An annual with flexuose and fleshy stems about 1 ft. long, native of the W. United States. Leaves ovate acute, lobed and serrated. Flowers sulphur-yellow, paler beneath, almost white, ovate or obovate, slightly serrated.

Culture &c. as above.

M. hispida.—A Mexican perennial 1½ ft. high, with almost sessile leaves. Flowers in summer, yellow, with obovate abruptly pointed petals.

Culture &c. as above.

M. lævicaulis.—A Californian biennial about 2 ft. high, with bright yellow flowers 2–3 in. across, opening in the morning and closing after midday. *M. nuda*, with white flowers, is very similar.

Culture &c. as above.

M. Lindleyi (*Bartonia aurea*). — A showy Californian annual 1–1½ ft. high, with oblong linear lacerated or toothed sessile leaves, 8–5 in. long. Flowers golden-yellow, Hypericum-like, with a zone of orange at the base, and numerous slender golden-knobbed stamens radiating from the centre.

Culture &c. as above. May be sown in the open border in patches.

M. oligosperma.—A perennial about 2 ft. high, native of Louisiana. Flowers in early summer, yellow, with pointed petals.

Culture &c. as above.

M. ornata (*Bartonia decapetala*).—A pretty annual about 2 ft. high, native of Missouri, with hairy glandular, deeply cut leaves. Flowers late in summer, 2½ 4 in. across, white, scented, opening after sunset.

Culture &c. as above.

LOASA.—A genus with 50 species of erect, climbing or prostrate herbs with stiffish stinging hairs. Leaves alternate or opposite, entire, lobed, or very much divided. Calyx lobes 5, equal. Petals 5, hooded, spreading or erect, more or less united into a bell-shaped corolla, alternating with 5 scales, each having 2 3 bristles on the back, and 2 awl-shaped appendages at the base. Stamens numerous, in bundles opposite the petals; staminodes 10, 2 opposite each scale. Capsule smooth or ribbed, rarely twisted.

Culture and Propagation. — Only a few species are in cultivation, and these are easily raised from seeds sown either in gentle heat in February or March, or in the open border in May. The trailing kinds may be utilised for covering old tree stumps, arbours, trellises &c.

L. acanthifolia (*L. Placei*).—A pretty Chilian annual about 4 ft. high, with pinnately cut and toothed leaves, and yellow flowers in summer.

Culture &c. as above.

L. hispida.—A pretty trailing annual about 13 ft. high, native of Lima. Leaves oblong, deeply and pinnately cut, downy. Flowers in July, 1 in. across, bright lemon-yellow, with a green and white centre.

Culture &c. as above.

L. lateritia (*L. aurantiaca; L. tricolor*). — A very pretty trailing Chilian annual or biennial with long-stalked and pinnately lobed and crenate leaves 3–4 in. long. Flowers in August, coral-red, about 1½ in. across, with hooded or boat-shaped petals into the cavities of which the bundles of white stamens are depressed during the day, but toward evening spring up between the 5 pairs of yellow awl-shaped staminodes. Outside the latter are 3 purple-tipped scales.

Culture &c. as above. The stems attain a length of 10–12 ft. during the season. The whole plant—stems, leaves, and flowers—is covered with roughish stiff hairs mostly pointing downwards.

L. Pentlandi. — A beautiful Peruvian annual with leaves 4–6 in. long. Flowers in early summer, 2 in. across, with orange petals; stalks about 4 in. long.

Culture &c. as above.

L. prostrata. — A trailing flexuose Chilian annual with stalkless, heart-shaped, ovate, deeply angular leaves, and yellow flowers in summer.

Culture &c. as above.

L. vulcanica (*L. Wallisi*).— An annual about 2 ft. high, native of Ecuador. Leaves palmately 3–5-lobed and cut. Flowers in summer about 1½ in. across, white, with 5 erect scales or nectaries, red barred with yellow and white.

Culture &c. as above.

BLUMENBACHIA.—A genus with 12 species of erect or climbing herbs with stiffish, stinging hairs, and opposite, almost sessile or stalked, entire, lobed, or pinnatifid leaves. Floral characters almost the same as in *Loasa*. The capsule when ripe splits to the base into 10 valves.

Culture and Propagation. — This is practically the same as for the Loasas. The plants flourish in ordinary good garden soil in open sunny situations, and may be used in the flower border in masses. The seeds may be sown in the open border where the plants are to bloom, and the seedlings afterwards thinned out.

B. chuquitensis.—A Peruvian climber with oblong lance-shaped pinnate and deeply cut leaves. Flowers in September, consisting of 5–10 boat-shaped petals, yellow inside, red outside.

Culture &c. as above. Sticks should be placed to the plants for climbing.

B. coronata (*Caiophora coronata*).— A graceful, tufted, erect biennial about 1½ ft. high, native of Chili. Leaves narrow, twice pinnately cut into small segments. Flowers in summer, 2 in. across, pure glossy white, with 5 hooded hairy petals, dotted inside.

Culture &c. as above.

B. insignis (*Loasa palmata*). — A Chilian trailer about 1 ft. high, with lower leaves 5–7-lobed; upper ones deeply twice pinnatifid. Flowers in summer, about 1 in. across, white with reddish scales.

Culture &c. as above.

GRAMMATOCARPUS. — This genus contains only the following species, which is also known as *Scyphanthus elegans*:—

G. volubilis.—A Chilian annual with opposite or twice or thrice pinnately cut downy leaves. Flowers in summer, axillary, sessile, yellow, calyx-tube linear elongate, 5-lobed. Petals 5, saccate, alternating with smaller bristly scales. Stamens numerous in bundles opposite the petals. Staminodes 10, papillose, in pairs opposite the scales.

Culture and Propagation.—This is practically the same as for the Loasas above. Seeds may be sown in cold frames in autumn and the seedlings wintered under glass until the end of the following May. Or they may be sown in gentle heat in February and March, for planting out at the same period. The plants flourish in ordinary good and well-drained garden soil, and as they climb 6–9 ft. high may be used for covering trellises, arbours &c.

L. PASSIFLOREÆ—Passion Flower Order

This order contains mostly plants of climbing habit, with alternate lobed leaves and lateral tendrils. They are remarkable for having a corona of beautifully coloured radiating filaments between the petals and stamens. Flowers regular, hermaphrodite or 1-sexed. Calyx tube persistent; lobes 3 or more, leathery. Petals none or as many as the calyx-lobes. Stamens 3–5, rarely more, perigynous and inserted with the petals in the throat of the calyx, or hypogynous. Ovary superior, 1-celled. Style simple, or 3–5, with club-shaped or dilated stigmas. Fruit capsular or a berry, often edible.

The order has about 20 genera with 250 species, but the only hardy representative is described below.

PASSIFLORA (Passion Flower).—The characters of this genus are the same as those of the order above described. The popular name is derived from the parts of the flower being supposed to resemble respectively the crown of thorns (the corona), the five wounds (the 5 stamens), and the nails (3 stigmas) of our Lord's Passion.

P. cærulea.—A beautiful climber from Brazil and Peru, with smooth, 5-parted leaves and oblong entire lobes. Flowers from June to October, faintly scented, scarcely lasting more than a day. Calyx segments pale greenish-white; petals similar in shape, varying from white to pale blue and rosy-red; styles purplish; filaments of the corona in two circles, purple at the base, white in the middle, blue at the tips. Fruit egg-shaped, yellow and fragrant when ripe. The variety *Constance Elliott* is a beautiful white-flowered form, quite as hardy as the type.

Culture and Propagation. — The Passion Flower is best grown against a warm south wall, although in south coast localities it may be trained over arbours and trellises. It likes a rich turfy loam mixed with a little peat and sand. In spring cuttings of the young shoots about 6 in. long may be inserted in sandy soil under a glass. As soon as well rooted they may be potted off singly and grown on for some time in a greenhouse, gradually giving more light and air to harden the plants off for placing out of doors.

LI. CUCURBITACEÆ—Gourd Order

The characteristics of this order are rendered more or less familiar by the Cucumber, Marrow, Melon, and Gourd. They are mostly climbing or prostrate annual herbs, often with a large fleshy perennial rootstock. The leaves are alternate, simple, lobed or divided. The tendrils, when present, are lateral, solitary, simple or branched, and spirally twisted. Flowers monœcious or diœcious, white or yellow, rarely red or blue. Calyx-tube adnate to the ovary; lobes 5, rarely 3 or 6. Petals 5, rarely 3 or 6, free, or rarely gamopetalous, often confluent with the calyx. Stamens usually 3 (rarely 5, or 1, 2, or 4). Fruit inferior, usually fleshy, often large, variable in form and sometimes highly coloured.

This order is interesting chiefly on account of the many beautiful, diversely shaped, and brilliantly coloured fruits—popularly known as Gourds—which it yields, chiefly from *Cucurbita Pepo*, a native of the Levant. Gourds vary from ½ oz. to 200 lbs. in weight, and are round, flask-shaped, ringed, warted, striped, mottled, angled, snake-like &c., with many intermediate and indescribable forms—all so highly curious and interesting that they are well worth a place in the ornamental garden, trained up gnarled tree trunks, over trellises, or arbours, hanging from hedges &c., the better to show their fruits.

Culture and Propagation.—Gourds thrive in well-dug and well-manured soil. Seeds are best sown in a cool frame at the end of April. After germination as much light and air as possible should be given to make the plants sturdy, but care must be taken, especially at nights, to protect them from the spring frosts. By the end of May or the first week of June, the seedlings may be transferred to the positions in which they are to flower and fruit. They require plenty of water during the summer, and should be well mulched with rotted manure to prevent evaporation from the soil and to replenish the food taken from it by the gross-feeding roots.

Gourds have been grown successfully simply by sowing the seeds in the flowering quarters about the second week in May, and in mild localities this method might be adopted to save the labour of transplanting from frames.

THLADIANTHA.—This genus consists of 3 or 4 species of softly downy climbing plants with ovate heart-shaped, deeply lobed, toothed leaves, diœcious flowers, and oblong, fleshy, many-ribbed fruits, with hollows between the ribs.

T. dubia, the only species generally grown, is a native of India and China. It has tuberous roots and climbing stems which reach a height of 12 to 20 ft. in the course of the season in favourable situations. They are furnished with ornamental heart-shaped, hairy leaves, and in summer produce an abundance of yellow flowers, succeeded by bright red fruits about the size and shape of a hen's egg and covered with downy hairs.

Culture and Propagation. — This species grows in ordinary soil, and is best against a sunny wall, although almost any position will suit it in milder parts.

It is rarely seen in fruit, simply because the fact mentioned above is usually overlooked, viz. that the flowers are diœcious, that is, the male and female flowers are borne on separate plants. To secure a crop of the bright red fruits, therefore, it is essential to have a male and female plant close together, or at least convenient to one another, so that the pollen may be used for fertilising the pistils. The climbing stems die down to the tuberous rootstock every winter.

Propagation is easily effected by dividing the tuberous rootstocks in spring. Seeds may also be sown in gentle heat about March, afterwards pricking out the seedlings and growing the plants on in pots until about the end of May or beginning of June when they may be transferred to the outdoor garden.

BRYONIA (Bryony).—A genus of slender climbing perennial herbs, with 3-5 angled or lobed leaves, and small dirty white or yellow flowers usually diœcious. Fruit small, red, black, or green.

The plant known as 'Black' Bryony (*Tamus communis*) is described at p. 884.

B. dioica.—A hairy slender climber, native of the hedges and thickets in England. It has large, fleshy, tuberous rootstocks, and roundish heart-shaped 5-lobed leaves 3–5 in. across. The hairy greenish flowers ½–¾ in. across appear in corymbose clusters from May to September, and the female ones are followed by red berries ¼ in. in diameter.

Culture and Propagation. — This grows rapidly in any soil, and is very useful for trailing over old hedges, fences, walls &c. Notwithstanding the fact that it is a British weed it is a very ornamental plant both when in flower and in fruit. It may be increased by sowing seeds in the open ground when ripe. Once established in a garden to clamber over rough hedges, fences &c. it may be left to look after itself.

B. erythrocarpa (*Bryonopsis*). — An East Indian annual climber often attaining a height of 9–10 ft. in the course of the season. It has alternate palmate leaves with 5 oval lance-shaped toothed lobes separated from each other by roundish sinuses. Both male and female flowers are borne on the same plant, and not on separate ones as in the Bryony. They are yellowish-green, the female (or pistillate) ones being in due course succeeded by roundish berries, about the size of a Cherry, which are green at first, then striped with white and afterwards deep crimson spotted with white.

B. laciniosa is closely related but differs chiefly in the berries, which are yellowish-green striped with white, and not so ornamental as those of *B. erythrocarpa.*

Culture and Propagation.—Owing to the graceful climbing habit and foliage and the colouring of the fruits, these plants are worth growing among other annual climbers and are useful for covering trellises &c. Seeds may be sown in gentle heat in March, and the young seedlings grown on in pots until the end of May and then planted out.

ABOBRA.—A genus with 2 or 3 species of smooth or rough climbers, with cut leaves, and usually 2-cleft tendrils. Flowers diœcious, slender, greenish. Berry small, drooping.

A. viridiflora.—A native of S. America, with dark green elegantly cut and divided glossy pale green leaves, fragrant flowers, and oval scarlet fruits about the size of a Filbert borne by the female flowers.

Culture and Propagation.—This plant grows rapidly, and when trained over arbours, trellises &c. looks very handsome, especially when in fruit. It has fleshy tuberous roots, which may be taken up in autumn, and stored like Dahlias in a cool, dry place free from frost. To secure a good supply of the scarlet fruits male and female plants should be grown together.

This species may be increased by dividing the tuberous rootstocks, and where the male and female kinds have been noted it is easy to place roots of each together at planting time in spring. Seeds may also be sown in gentle heat in spring. The seedlings must be pricked out in due course and grown on in pots under glass until about the end of May or beginning of June, when it will be safe to transfer them to the open ground. Cuttings of the young shoots from the tuberous roots may be rooted in sandy soil in a hotbed in spring in the same way as recommended for Dahlias (see p. 519).

LII. BEGONIACEÆ—Begonia Order

This order consists of *Begonia*, *Begoniella* and *Hillebrandia*. The last genus was in cultivation several years ago, but has since become a lost garden plant; and *Begoniella* has not yet been introduced. For practical gardening purposes, the order is thus represented only by the genus *Begonia*.

BEGONIA (Elephant's Ear).—A genus containing upwards of 350 species of juicy herbs or undershrubs, many having perennial tuberous rootstocks. Leaves alternate, simple, more or less unequal sided, entire, lobed or parted, irregularly toothed. Flowers often showy, monœcious. Male flowers consisting of 2 large outer (sepaloid), and 2 small inner (petaloid), segments. Stamens numerous, free or united in one bundle. Perianth of the female flowers has 2–10 segments, of which the 2 outer ones are larger and sepaloid. Ovary inferior, often 3-, rarely 2-, or 4–5-celled. Styles 2–4, free, or united at the base, with branched twisted stigmas. Fruit a capsule. usually 3-angled and unequally 3-winged. Seeds numerous, minute.

Begonias, both double and single, are now so well known in the flower garden that one can scarcely credit the fact that less than a generation ago they were not only unknown but not dreamt of. The forms that now rival the Rose, Carnation, Hollyhock, and Camellia in form and colour have all been developed by careful cross-breeding within the last quarter of a century, and they have in that short time reached such a stage that the characters of their progenitors have been entirely lost. Indeed, some of the original parents themselves have disappeared altogether from cultivation.

The species chiefly concerned in the development of the florist's Begonia were *B. Pearcei* (yellow), ***B. boliviensis*** (bright scarlet), *B. Veitchi* (bright orange-red), *B. Clarkei* (rosy-red), ***B. rosæflora*** (rosy-red) and *B. Davisi* (bright crimson) —natives of Peru and Bolivia, some of them at an altitude of as much as 11,000 to 13,000 ft. It will be noticed that with the exception of *B. Pearcei* they have all red flowers, and yet their progeny have crimson, pink, scarlet, rose, white, yellow, orange and innumerable intermediate shades. *B. Pearcei*, ***B. boliviensis***, and *B. Veitchi* have been more used than the other three species, and they are most in evidence in the beautiful hybrids of to-day. All the flowers with yellow shades show the influence of the yellow-flowered *B. Pearcei*.

The value of the florist's Begonia as a garden plant is now well recognised, and owing to the great beauty of the flowers and the length of time they last, there is a probability that many of the older plants used for bedding out in summer will have to make way more and more for the Begonia every year.

Although both single and double kinds may be used, the singles are on the whole better for bedding out. To make a good display tubers at least one year old should be used. After the winter's rest in sand or coco-nut fibre in a dry, cool place free from frost, the tubers about February, March, or April may be placed in gentle heat to start them into growth. They should be gradually hardened off by putting in a light, airy place, and by the beginning of June they will be sturdy enough for planting out. In the autumn, when the leaves and stalks are withering, the plants should be lifted and dried carefully, removing all decaying stems and leaves from the tubers. These may then be stored in sand or fibre as above stated.

The soil for Begonias should have been well dug and manured some time previous to planting out, and should consist of sandy loam and leaf soil. After planting the surface may be top-dressed with coco-nut fibre; some of the dwarf-tufted Violas (see p. 284) with flowers that will harmonise may be used as a carpet in between.

Propagation.—Bedding Begonias may be increased by seeds, cuttings, or division of the tubers. Seeds, which are very fine and require some skill in sowing thinly, are perhaps the best and quickest means of increasing the plants, but there is of course always likely to be great variation in the colour of the flowers. The *modus operandi* is as follows:—About the end of January shallow pans or boxes of sandy loam and leaf soil are prepared, being well mixed together, with some finely sifted soil on top to make the surface level. The whole is firmly pressed and watered with a very fine-rosed can, or dipped. The dust-like seeds should be sown carefully and as evenly as possible over the surface, but not covered with any soil. The pans or boxes are then placed in a temperature of 65°-70° F. with bottom heat. As soon as the seedlings become large enough they are pricked out into similar pans or boxes, and this operation may have to be again performed if the seedlings become too crowded before planting out time arrives. Increase by leaf-cuttings is only practised when some special varieties are required to be kept pure. In dividing the tubers care must be taken not to cut through a bud at the apex.

Of late years the forms of a shrubby species—*B. semperflorens*—have become popular as bedding plants. They are valuable chiefly on account of their rather small foliage, which towards autumn assumes many beautiful tints of colour. *Vernon's* variety becomes deep purple-crimson. The flowers of this section are small, white or pink, and mostly single. They produce seeds freely and may be increased as directed above.

In the case of tuberous Begonias it is scarcely necessary to occupy space with a list of varieties. The names given are so purely fanciful and unstable that each year sees quite a new selection. It is therefore best to consult a nurseryman's current catalogue if it is desired to secure the most recent novelties.

LIII. CACTEÆ—Cactus Order

A curiously interesting order of plants abounding in watery or milky juice, and mostly devoid of leaves, the functions of which are performed by the stems, the latter varying a good deal in shape, being cylindrical, conical, flattened, angular, ribbed &c., and often covered with hooked spines, or cushions of prickles. Flowers regular and hermaphrodite, often large and brilliant, with numerous coloured sepals and petals and thread-like stamens; style long, often with a many-cleft, radiating stigma. Fruit a berry, inferior; seeds numerous. All natives of America, chiefly Mexico, but several from Peru and Brazil.

Being natives of dry sandy regions Cactaceous plants require similar conditions under cultivation. They grow well in a mixture of sandy soil with old mortar &c. added. Only a few kinds are grown and are seen chiefly in cottagers' windows. The 'Whip Cactus' (*Cereus flagelliformis*), with prostrate, creeping, 10-angled stems and red or pink flowers, is fairly common. Many of the Mamillarias and Echinocactus and Cereus could be grown in rooms, as they take up little space and require practically no attention. Their cultivation out of doors is hardly worth attempting except in the most southern parts of the country, but it is questionable if they will ever receive much attention except from enthusiasts, and even these usually grow cool in their cultivation after a year or two.

LIV. FICOIDEÆ—Fig Marigold Order

An order containing about 450 species of small shrubs or herbs, mostly uninteresting, with opposite or alternate, usually fleshy or thickened, flat, round, or triangular leaves. Flowers usually hermaphrodite, regular. The genus Mesembryanthemum is the only one of any garden value.

MESEMBRYANTHEMUM (Fig Marigold).—A genus including about 300 species of erect or prostrate herbs with fleshy opposite leaves, very variable in form, and conspicuous white, yellow, or rosy Daisy-like flowers. Calyx tube adnate to the ovary, limb 5–8-lobed. Petals numerous, linear, in one or more series. Stamens numerous. Capsule contained in the fleshy calyx tube.

Culture and Propagation.—Although not hardy, several species are grown out of doors in summer. They are easily grown in a mixture of lime-rubble, loam, sand, and rotted manure, and require the sunniest possible place to develop their flowers properly. They may be easily increased by putting portions on moist sand in the sun, and will root in a few weeks. They are nearly all natives of S. Africa.

M. cordifolium variegatum. — This handsome little perennial is probably the best known member of the genus and is largely used for edgings &c. The small, flat, heart-shaped leaves are distinctly edged with creamy white, and when covered with bright rosy-purple flowers the effect is elegant.

Culture &c. as above. Easily increased by cuttings inserted in sandy soil under glass about March and April.

M. crystallinum (*Ice Plant*).—A hardy procumbent S. European annual, covered with large glittering crystal-like granules, which give the plant a frosted appearance. Leaves alternate, ovate, wavy. Flowers from May to August, white, axillary, nearly sessile.

Culture and Propagation. — This species grows well in any good soil and may be used in the rockery in sunny positions. Seeds should be sown in gentle heat in March. The seedlings should be pricked off, and by June they will be large enough to plant out 6–8 in. apart.

M. pomeridianum.—A South African annual 3–6 in. high, with cylindrical downy reddish stems, and thick oblong lance-shaped leaves, ciliated on the margins. The golden-yellow flowers about 2 in. across, and somewhat resembling the yellow-flowered Sweet Sultan, appear in August, and are remarkable for not expanding fully until towards the evening.

Culture &c. as above and for *M. tricolor.*

M. tricolor.—A pretty tufted annual with long, linear acute leaves. Flowers pink and crimson with a dark eye, on long stalks covered with small granular protuberances. There is also a pretty white-flowered variety called *album.*

Culture and Propagation.—As this plant dislikes being transplanted it is best to sow the seeds in the open about April where the plants are to bloom. They make pretty edgings to borders, and during the sunniest part of the day they are a mass of blossom.

LV. UMBELLIFERÆ—Sea Holly Order

A large order containing over 150 genera and 1,300 species of herbs or shrubs, rarely trees, with usually much-divided leaves. Flowers more or less regular, hermaphrodite, or often polygamous-monoecious, rarely dioecious, in compound or simple umbels, or rarely capitate or whorled. Calyx 5-lobed, or almost absent. Petals 5, epigynous, usually obovate or obcordate, the tips usually incurved. Stamens 5, filaments incurved. Ovary inferior, usually 2-celled; styles 2, distinct, erect or recurved. Fruit of 2 indehiscent, 1-seeded, flattened carpels or mericarps, with 10 more or less prominent ridges or oil canals technically known as vittæ.

TRACHYMENE. — A genus with about 14 species of usually hairy herbs, having ternately dissected, or rarely divided, toothed leaves, and flowers in simple umbels.

T. cærulea (*Didiscus cæruleus*).—A native of W. Australia 1–2 ft. high, with leaves once or twice three-parted; lobes linear wedge-shaped, trifid or incised. Flowers in July and August, lavender-blue, on long stalks, each bearing an umbel 1–2 in. across. There is also a white-flowered variety rarely seen.

Culture and Propagation. — This annual is best raised from seeds sown in heat in February or March, but care must be taken not to keep the seedlings too moist, or they may damp off. By the end of May they will be strong enough for planting out in rather good warm soil. It may be noted that plants with blue flowers are very rare in the Umbellifer order, and this rather tender annual is therefore decidedly interesting.

ERYNGIUM (ERYNGO; SEA HOLLY). A genus containing over 100 species of usually spiny, perennial, Thistle-like herbs, with spiny-toothed, lobed or dissected leaves, rarely entire and stiffly ciliated. Flowers sessile, in dense heads or spikes, surrounded by a whorl of spiny bracts. Calyx teeth rigid, acute or pungent. Petals erect. Disc dilated. Fruit ovoid or obovoid, scarcely compressed, with a broad commissure.

Culture and Propagation.—Many of the Eryngiums are now very popular garden plants, and are more valued for the appearance of the bracts than for the flowers themselves. Some of the more highly coloured species like *E. amethystinum* when grown in masses or beds by themselves are very effective. They thrive in a light, well-drained, sandy loam, and may be increased by very careful division early in autumn or in spring. If not carefully done the divided plants may, and often do, die. They are perhaps better raised from seeds sown as soon as ripe, and kept in a cold frame until spring, when they will germinate. By September the seedlings will be fit for planting out, or if the season be unfavourable, they may be planted the following spring. The chief point to remember in the cultivation of Sea Hollies is the fact that they dislike moist or wet situations, and enjoy warm and thoroughly well-drained soil.

The following are a few of the best for garden purposes, although many others are to be found in botanical collections:—

E. alpinum.—A native of the Alpine pastures of Switzerland, 1½–2 ft. high. Lower leaves long-stalked, heart-shaped, toothed, undivided, the upper ones stem-clasping, palmately lobed, and serrately fringed. Flowers in summer, blue or white, in oblong heads; bracts 10–20, or a beautiful deep blue, the outer ones pinnatifid, the inner ones deeply serrate-ciliate. The erroneous name of *cælestinum* has recently been applied to this plant by some growers and may lead to confusion.

Culture &c. as above. This species likes a rather chalky well-drained soil. Increased by seeds or division.

E. amethystinum. — A beautiful but rather straggling species 1–1½ ft. high, native of Dalmatia and Croatia. Lower leaves pinnatifid, with cut spiny lobes. Flowers in July and August, amethyst-purple, in rounded heads, with 7–8 long lanceolate toothed bracts and brilliant violet-purple stems.

Culture &c. as above. This species is often confused with *E. oliverianum*, a much taller and more vigorous plant. It is easily raised from seed.

E. Bourgati.—This is the 'Chardons bleus' of the Pyrenees, and grows 1–2 ft. high. Lower leaves roundish, 3-parted, with pinnatifid or forked lobes. Flowers from June to August, bluish, in ovoid heads, with 10–12 beautiful long, lance-shaped, prickly bracts of a striking bluish sea-green colour.

Culture &c. as above.

E. bromeliæfolium.—A distinct Mexican plant 3–4 ft. high, with broadly lance-shaped linear, parallel-veined leaves, having awl-shaped teeth along the margins and reminding one of some of the tropical Bromelias. Flowers in July, white, in round heads, with 10 lance-shaped acute bracts.

Culture &c. as above.

E. cæruleum.—A pretty Himalayan perennial 2–3 ft. high, with oblong, entire or slightly crenate lower leaves, borne on long stalks, the upper ones on the stems being stalkless and palmately divided. The steel-blue flowers appear in summer in heads surrounded by steel-blue spiny bracts.

Culture &c. as above. Increased by seeds or division. Quite hardy in most places in well-drained soil.

E. corniculatum. — This closely resembles *E. alpinum* in appearance and might easily be mistaken for it if the two species were not seen side by side. It grows about 2 ft. high, and has smaller and more loosely arranged steely-blue flower heads and bracts.

Culture &c. as above.

E. eburneum.—This species is a native of Monte Video, and is closely related to *E. bromeliæfolium.* It grows 4–6 ft. high and has stiffer and stronger stems. The leaves are also broader and stiffer, and are slightly recurving. It produces its heads of whitish flowers tinged with yellow in July and August, and is on the whole a very ornamental plant for massing in groups for subtropical effect.

Culture &c. as above.

E. giganteum. — A native of the Caucasus 3–4 ft. high, with forked stems. Leaves heart-shaped, lower ones entire, roughish, downy or smooth beneath, net-veined, crenate-toothed; upper ones stem-clasping, deeply lobed, spiny. Flowers in summer, blue, in ovoid heads, surrounded by 8–9 ovate or lance-shaped, deeply cut, spiny bracts of a more or less beautiful blue-green tint.

Culture &c. as above. This species flourishes in almost any position so long as the soil is well drained.

E. maritimum (*Common Sea Holly*). A native of the sandy shores of the British Islands, with stout stems 1–2 ft. high. Leaves of a whitish glaucous hue, lower ones roundish, 3-lobed, spiny, upper ones palmate. Flowers from July to October, bluish-white, in ovoid heads, with 5–7 ovate, spiny-serrate bracts.

Culture &c. as above.

E. oliverianum.—This species is often confused with *E. amethystinum.* It grows much taller than that species, from 2–4 ft. In habit and general appearance it resembles *E. alpinum*, and produces in great abundance its heads of bright steely-blue flowers, with 10–12 bracts, during the summer.

Culture &c. as above. Easily raised from seeds.

E. pandanifolium. — A noble species from Monte Video, 10–15 ft. high. Lower leaves 4–6 ft. long, very glaucous, concave, pointed, with spiny margins. Flowers purplish, in rather small roundish heads with scarcely any bracts.

Culture &c. as above. This fine species is perhaps not quite so hardy as some of the others, but it grows very well in southern parts. As a single specimen on a lawn it looks well. *E. Lasseauxi* is nearly related, and quite hardy. It grows only 6–7 ft. high, however, and its narrow leaves rarely exceed a yard in length.

E. planum.—A native of E. Europe, 1–2 ft. high, with white and blue stems. Lower leaves ovate heart-shaped, crenated, undivided, on long stalks; upper ones stalkless, more or less 5-parted and serrated. Flowers in summer, blue, in rounded heads, with 6–8 lance-shaped, remotely spiny-toothed bracts.

Culture &c. as above.

ASTRANTIA (Masterwort). — A genus of smooth, erect, often branched, herbaceous perennials, with palmately lobed and dissected toothed leaves. Umbels simple or irregularly compound, surrounded by an involucre of many radiating, often coloured bracts. Flowers polygamous, the fertile ones on shorter stalks than the sterile. Calyx teeth very sharp. Petals notched with a long inflexed point. Fruit ovoid or oblong, almost round; commissure broad; carpophore none.

Culture and Propagation.—Astrantias although not particularly showy have a peculiar beauty of their own. They grow in any ordinary soil, but prefer a rather damp position, and are useful for banks, borders, or woodland walks. They may be increased by division in early autumn or spring. Seeds may also be sown in cold frames as soon as ripe, and the seedlings may be transplanted in mild weather the following spring.

A. carniolica.—A pretty species, 6–12 in. high, native of Carniola. Lower leaves with 5–7 oblong-pointed, unequally serrated lobes. Flowers in May, white. Bracts 12–18, entire, white, with a central green line tinged with red.
Culture &c. as above.

A. helleborifolia (*A. maxima*).—A native of the E. Caucasus, 1–2 ft. high. Lower leaves with 3 ovate-lance-shaped, unequally serrated lobes. Flowers in June, pink, with 12–18 ovate-lance-shaped, bristly bracts of the same colour, somewhat exceeding the umbel.
Culture &c. as above.

A. major.—A very distinct and pretty European species 1–2 ft. high, now naturalised in woods near Ludlow and Malvern. Leaves with 3–7 ovate-lance-shaped, rather 3-cleft, bristly serrated lobes. Flowers in June and July, white or pink, with 15–20 linear lance-shaped, entire reticulated bracts, white beneath, dark green tinged with pink above.
Culture &c. as above.

A. minor.—An interesting little perennial 6–9 in. high, native of the Alps and Pyrenees. It has leaves palmately cut or divided into 7–9 lance-shaped acute toothed lobes. The small rosy-white flowers appear in June and July, the heads being surrounded by 12–15 whitish bracts.
Culture &c. as above.

HACQUETIA.—A genus containing only the species described below:—

H. Epipactis (*Dondia Epipactis*).—A curiously pretty perennial 3–6 in. high, native of Carinthia and Carniola. Lower leaves stalked, palmate, with 3 wedge-shaped, 2–3-cleft leaflets. Flowers in spring, greenish-yellow, polygamous, on short pedicels, with an involucre of 5–6 obovate bracts, longer than the umbels. Calyx teeth very sharp. Petals notched.

Culture and Propagation.—Being rather slow in growth it is safer not to divide the plant until strong healthy clumps have been formed. Spring is the best time for division. The plant likes a good rich loam, and may be used in the rockery, edges of borders, banks &c.

MOLOPOSPERMUM.—A genus containing only one species here described:—

M. cicutarium.—A very ornamental perennial 3–6 ft. high, native of the mountains of Central Europe. The strong hollow and furrowed stems are furnished with large handsome leaves pinnately divided and cut into irregularly toothed lance-shaped segments. The yellowish-white polygamous flowers are borne in May in many-rayed umbels, and have oblong or wedge-shaped petals with incurved or slightly reflexed tips.

Culture and Propagation.—This plant makes an elegant bush of dense irregular growth, with finely divided Fern-like foliage that renders it suitable either for grouping on grass or for the wilder and more picturesque parts of the garden. It flourishes in ordinary good garden soil with plenty of moisture in summer, and may be increased by division of the roots in early autumn or spring; or by seeds sown in cold frames when ripe, afterwards transferring the seedlings in mild weather in spring.

BUPLEURUM (HARE'S EAR).—A genus containing 60 species of quite smooth shrubs or rigid annual or perennial herbs, with mostly entire leaves. Flowers usually in compound many-rayed umbels. Calyx teeth obsolete. Petals flat, incurved at the apex. Fruits flattened.

B. fruticosum.—A Spanish shrubby species 3–6 ft. high, with purplish branches and oblong, leathery, sea-green stalkless leaves narrowed at the base. Flowers in July, yellowish, with long involucral bracts.

Culture and Propagation.—This species grows readily in ordinary soil, and may be increased from seeds sown as soon as ripe in cold frames, or in spring, afterwards pricking the seedlings out when large enough for transferring to the open border. Or the plants may be more readily increased by dividing the roots in early autumn or spring.

There are other species such as *frutescens*, *graminifolium*, *falcatum*, *rotundifolium* &c., but they are not generally grown except in botanic gardens.

MYRRHIS (MYRRH; SWEET CICELY). A genus with 2 species of hairy perennials, with finely cut, pinnate leaves and white polygamous flowers. Calyx teeth minute or absent. Petals wedge-shaped, obovate or oblong, incurved at the tip. Fruit flattened, shortly beaked. Carpophore 2-cleft.

M. odorata.—A graceful native plant 2–3 ft. high, with ternately decompound leaves, having pinnately cut leaflets. Flowers in May, white, sweet-scented, with involucres of many lance-shaped ciliated bracts. Fruit about 1 in. long, with 5 prominent ribs, usually clothed with minute rigid hairs.

Culture and Propagation. — This species is suitable for naturalising near woodland walks, shrubberies, and wild places generally. It may be increased by division in early autumn or spring or by seeds sown out of doors as soon as ripe in prepared spots, afterwards pricking the seedlings out in spring. It was once used as a pot herb in this country.

FŒNICULUM (Fennel).—A genus of 3 or 4 species of tall, smooth, biennial or perennial herbs, with finely divided, pinnate leaves, and yellow flowers in compound umbels.

F. dulce and **F. vulgare** (or *officinalis*) are best known. The former, although a biennial, is considered by some to be merely a form of the perennial *F. vulgare*, a native of Britain and S. Europe.

Culture and Propagation.—Although useful as pot herbs, the Fennels have such graceful feathery foliage that they are worth a place on any waste bank. They will thrive in ordinary soil, and may be easily increased by seeds sown in spring out of doors or by division of the roots early in autumn.

MEUM. — A genus with only one species:—

M. athamanticum (*Spignel*). — An elegant and fragrant native perennial 6–18 in. high, chiefly found in northern alpine pastures. The oblong leaves are pinnately divided and cut into numerous Fern-like leaflets, and the white or purplish flowers are borne in compound umbels in June and July.

Culture and Propagation. — This graceful perennial is chiefly valuable for its finely divided elegant foliage, and is a suitable plant for the border or rock-garden. It flourishes in ordinary garden soil, but likes plenty of water during the summer months to keep it in a fresh-looking condition. It may be increased by dividing the roots in early autumn or spring; and by seeds sown in the open border or cold frames when ripe.

ACIPHYLLA.—A genus containing about 20 species of curious perennial herbs with pinnately divided and much-cut leaves. Flowers white, often polygamous-diœcious, borne in compound umbels. Calyx teeth usually conspicuous. Petals acute or tapering, concave or slightly inflexed at the tip.

A. Colensoi.—This is a native of New Zealand and forms a roundish spiny bush 4–8 ft. high in its native country. *A. Lyalli* is very similar in habit but is smoother in all its parts, the leaves being pinnately divided into sharp spiny segments. *A. squarrosa*, known as the 'Bayonet Plant,' is the best known species and is similar to the others in habit and appearance.

Culture and Propagation. — These plants flourish in well-drained sandy soil and are suitable for warm sunny parts of the rock garden. They may be increased by dividing the roots in early autumn or spring, or by sowing the seeds in cold frames when ripe.

FERULA (Giant Fennel).—A genus with 60 species of glaucous smooth herbs, with large, finely divided leaves, and tall branched flower stems. Umbels compound, many-rayed. Fruit almost flat winged at the sides.

Culture and Propagation.—The Giant Fennels are noble-looking plants, especially if grown in deep rich soil. They are easily grown, and should be planted in positions in which they are not likely to be disturbed for a few years. Either singly or in small groups near a shrubbery, or on a lawn or grass land, they have a graceful effect, especially in early spring when their deep green beautiful foliage is seen to great advantage.

The plants have thick roots, and should be very carefully divided when an increase is desired. They are easily raised from seed, which should be sown as soon as ripe in a prepared spot, and afterwards carefully transplanted the following spring in mild showery weather.

The following are best known:—

F. communis.—A noble plant 8–12 ft. high, native of the Mediterranean region, with finely cut, needle-like, flaccid leaves, the upper ones with very large sheaths. Flowers in June, yellow; central umbel nearly sessile; side ones small, stalked; involucre wanting.

Culture &c. as above.

F. glauca.—A beautiful plant 6–8 ft. high, native of S. Europe. Leaves glaucous beneath, with linear, elongated, flat leaflets. Flowers in June, yellow; side umbels on longer stalks than the central one; involucre absent.

Culture &c. as above.

F. tingitana.—A native of N. Africa 6–8 ft. high. Leaves shining, with deeply toothed, oblong lance-shaped leaflets. Flowers in June; side umbels few, on longer stalks than the central ones.

Culture &c. as above.

HERACLEUM (COW PARSNIP; HAGWEED).—A genus containing 70 species of tall, strong, coarse-growing, more or less hairy biennial or perennial herbs, with large, broadly lobed, pinnate or ternately dissected leaves, and flowers in large, compound, many-rayed umbels. Calyx teeth absent, or more or less conspicuous. Petals wedge-shaped, rhomboid, or clawed, notched or deeply 2-lobed, points incurved. Fruit roundish obovoid or oblong-flattened.

Culture and Propagation. — Heracleums are essentially plants for the wild garden. They will grow in any poor soil and seem to be as much at home among brick rubbish as on the banks of streams or ponds. They may be increased by seeds sown in the open border when ripe or in spring, or by division in early autumn or spring, but will reproduce themselves from seed if left alone.

Some very fine plants of *H. giganteum* (or *villosum*)—the 'Cartwheel Flower'—were growing in June 1899 among the rubbish around Westminster Cathedral, London. They were 6–10 ft. high, with green and purplish stems 2–3 in. in diameter, with large lobed spreading leaves. Many of the umbels of white flowers were as much as 18 in. across, the stalks of each little umbel radiating upwards from the main stalk like the spokes of a wheel or the ribs of an umbrella turned inside out.

There are several other species, such as *setosum*, *sibiricum*, *eminens* &c., but they are somewhat confused, and none have such a fine aspect as *giganteum*, although the Persian *H. persicum* and the Caucasian *H. pubescens* are also noble-looking plants.

LVI. ARALIACEÆ—Ivy Order

An order containing about 40 genera and 340 species of erect or climbing trees or shrubs, rarely herbs, often clothed with a starry down, occasionally spiny. Leaves alternate or rarely opposite, entire, toothed, lobed, or palmately or pinnately divided. Stipules various, rarely none. Flowers regular, hermaphrodite, polygamous, or rarely diœcious, in heads, umbels, racemes, or panicles. Calyx tube adnate to the ovary. Petals 3 or more, often 5, usually valvate. Stamens as many as petals, rarely more. Ovary inferior, 1- or more celled. Fruit a drupe or berry.

ARALIA.—A genus containing about 30 species of smooth or downy, bristly or spiny shrubs or herbs. Leaves alternate, digitate, or once or more pinnately cut with serrulate leaflets. Flowers often polygamous-monœcious, in umbellate racemes or panicles, rarely in compound umbels. Calyx shortly 5-toothed. Petals 5, ovate, obtuse, or very shortly incurved at the tip, more or less imbricate at the edges. Ovary 2–5-celled. Fruit compressed, 3–5-angled, containing 2–5 stony seeds.

Culture and Propagation. — The species described below are the only ones more or less hardy in the British Islands. They thrive in a deep, rich, well-drained loam, and should be planted in sheltered sunny spots. In northern parts the plants may require protection with a little canvas or matting in hard winters. They have a very graceful and ornamental aspect, and lend a somewhat tropical appearance to the garden. Most of the species may be increased by seeds sown as soon as ripe or in spring in cold frames; or by root and stem cuttings 2–3 in. long in sandy soil in heat in early spring. Some kinds produce suckers freely, and these may be detached with as many roots as possible, and replanted in mild showery weather either in early autumn—say in September—or in spring.

A. cachemirica (*A. macrophylla*).—A Himalayan herbaceous perennial about 6 ft. high, with very large compound leaves, the hairy leaflets of which are 4–5 in. long and tapering to a point. The umbels of white flowers appear in summer and are arranged in a narrow terminal raceme 3–4 ft. long.

Culture &c. as above. Increased by seeds. Requires warm sunny situations.

A. chinensis.—When this species is well furnished with its leathery pinnate leaves, it is a very handsome shrub. It is a native of China and grows 6–12 ft. high, and in favourable situations considerably more. The flowers are creamy-white, in umbellate panicles, and add a beauty to the plant in July and August. *Dimorphanthus mandschuricus* is another name for it, and there is a variety called *canescens* with very hairy and prickly leaves 3–5 ft. long. A new variety with an irregular silvery bordering to the leaves has recently appeared.

Culture &c. as above. This plant enjoys warm and moist situations and may be grown near ponds, streams &c., where the roots are likely to secure an abundance of moisture.

A. edulis.—A hairy and spineless Japanese perennial 4–6 ft. high. Lower leaves pinnate, with about 5 leaflets; upper ones with stalked, finely toothed, downy leaflets. Flowers in summer, white, numerous, in rounded umbels. This is also known as *A. cordata*.

Culture &c. as above. Grows well in shade.

A. nudicaulis.—A native of North America 3–4 ft. high. Lower leaves pinnate, with 5 oblong-oval, tapering, serrate leaflets. Flowers in June, greenish, each division of the trifid scape bearing a many-flowered umbel.

Culture &c. as above. This herbaceous species grows well in shade and may be increased by division or from seeds.

A. racemosa.—A highly ornamental N. American herbaceous plant 3–4 ft. high. Leaf stalks 3-parted, each one bearing 3–5 ovate or heart-shaped, pointed, serrated, smoothish leaflets. Flowers in June, greenish-white, in terminal umbellate racemes.

Culture &c. as above. Increased by seeds or division. Grows well in shade.

A. spinosa (*Angelica Tree*).—A fine N. American shrub 8–12 ft. high, with simple prickly stems, forming an umbrella-like head. Leaves twice and thrice pinnate, with ovate pointed, deeply serrated leaflets. Flowers in autumn, small, white, in large panicles.

Culture &c. as above. Suckers are freely produced and may be utilised for increasing the plants.

ACANTHOPANAX.—A small genus of smooth or woolly shrubs or small trees closely related to the Aralias and often called by that name in gardens. The leaves are usually palmately lobed. Flowers polygamous or hermaphrodite. Petals and stamens 5, rarely 4.

Culture and Propagation.—The remarks made under Aralia are equally applicable to Acanthopanax. The plants like a deep rich and well-drained loam and warm sheltered situations fully exposed to the sunshine. They may be increased from seeds, cuttings of the roots, or ripened shoots, and also by suckers from the base.

A. ricinifolium (*Aralia Maximowiczi*). An elegant Japanese shrub with erect spiny stems, said to reach a height of 90 ft. in the forests of Yezo. Leaves long-stalked, palmately 5–7-lobed like those of the Castor Oil plant (*Ricinus*); lobes 3½ in. long, lance-shaped, serrate.

Culture &c. as above. This is a very striking plant and quite hardy as far north as the Thames Valley.

A. sessiliflorum.—A recently introduced species native of China and Japan. It has roughish dark green wrinkled leaves cut into 3–5 lobes. The small dull purple flowers with protruding stamens appear in summer and are closely packed into a roundish sessile head at the ends of the shoots.

Culture &c. as above.

A. spinosum (*Aralia pentaphylla*).—This must not be confused with the North American *Aralia spinosa* described above. It is a native of China and Japan, and in cultivation becomes a small shrub with prickly stems. The deep green leaves are cut into 3–5 ovate lance-shaped segments 2–3 in. long, with serrate margins, and constitute the chief attraction of the plant. The variety *variegata* has the leaves broadly edged with creamy white.

Culture &c. as above.

FATSIA.—A small genus closely related to Acanthopanax, and like that often called Aralia in gardens. The flowers are polygamous or hermaphrodite. Petals 4–6, membranous. Stamens 4–6.

Culture and Propagation. — The Fatsias are well known chiefly through *F. japonica* described below. They may be cultivated in the open air in the same way as the Aralia and Acanthopanax, in deep rich well-drained soil, and in warm sheltered spots. They are increased by seeds sown under glass, and by cuttings of the stems and roots.

F. horrida.—This rather tender shrub is a native of the Rocky Mountains and also Japan. The stems and leaf stalks are thickly covered with sharp spines—a circumstance that suggested the specific name, and the leaves are palmately lobed and densely covered with prickles on the midrib and principal veins.

Culture &c. as above. This plant requires a warm well-drained soil and positions sheltered from bleak winds. Too much moisture at the root in winter is very injurious, but during the spring and summer months plenty of water may be given.

F. japonica (*Aralia Sieboldi*). — A beautiful Japanese evergreen shrub 8–5 ft. high, with large, leathery, digitate, shining green leaves.

Culture &c. as above. This plant is usually grown in greenhouses, and thousands are raised every year from seeds sown in spring in heat. The tops of the seedlings are often taken off as cuttings and rooted, and make very fine symmetrical plants. Large specimens look well on lawns in semi-shady places. Not quite hardy in severe winters except in the mildest parts of the country. There are beautiful silver and golden variegated forms less hardy than the type.

F. papyrifera (*Aralia papyrifera*).—*Chinese Rice-paper Plant.*—A handsome Formosan shrub 6–8 ft. high, and practically hardy in sunny spots in the southern parts of the country. Protection from frost is required in northern localities. The leaves are 8–12 in. long, 5–7-lobed, downy when young, smooth when old. Flowers greenish in drooping panicles 2–8 ft. long.

Culture &c. as above.

HEDERA (IVY).—Botanically there are only 2 species of Ivy—the Australian (*H. australiana*) and the British (*H. Helix*). It is the latter and its numerous varieties that are so well-known in cultivation. The essential characters of the genus are:—climbing evergreen shrubs, with simple, undivided, lobed (or pinnate in *H. australiana*) leaves. Flowers polygamous in paniculate umbels. Calyx entire or 5-toothed. Petals 5, valvate. Stamens 5. Ovary 5-celled, styles united in a cone or short column.

The uses to which Ivy can be put are numerous. As a rule the common Ivy (*H. Helix*) and its green-leaved forms are more vigorous than the silver or golden forms. Covering old walls, old stumps of trees, decorating stone pillars of gateways, the sides of buildings, or under trees where nothing else will grow, are a few of the many ways in which Ivy may be appropriately used.

Culture and Propagation.—Although not particular as to soil, Ivy grows much better in good rich sandy loam than in poorer soil, and it covers any required space in a much quicker period.

Increase of the commoner sorts is very easy, especially where roots are freely produced on the stem. Pieces any length, if placed on the soil and covered over or pegged down here and there in the autumn, will readily root, and begin to grow freely the following spring. The Tree Ivies are usually grafted on stocks of a baser kind, and all rare and special varieties are usually increased by this means under glass, as it is quicker and more sure than by cuttings. Of late years Tree Ivies have become more popular, and in appropriate positions make fine bushes in the garden.

Below is a description of *Hedera Helix* and some of its best varieties:—

H. Helix (*Common Ivy*).—A native of the British Islands, Western and S. Europe, N. Africa, and West Central Asia. Leaves thick and shining, ovate, angled or 8-5-lobed; those of the flowerless stems usually much more divided than the others. Flowers in autumn, yellowish-green, succeeded by umbellate clusters of roundish fruits.

var. algeriensis (H. canescens, H

viridis). — A beautiful quick-growing variety, with large yellowish-green leaves varying from entire, broadly ovate or roundish, to a peculiar 3-lobed form. There is a variegated form of this.

var. arborescens (Tree Ivy).—An arborescent form of the Common Ivy. There are forms with golden and silver variegation, and also one with yellow berries.

var. canariensis (H. grandifolia).—Irish Ivy.—Leaves deep green, usually 5-lobed, terminal lobe largest. This is excellent for quickly covering walls, or bare ground under trees, or wherever anything else will not grow. The branches which produce flowers and fruit have ovate entire leaves. There are gold and silver variegated forms of the Irish Ivy, known respectively as *aureo-maculata* and *foliis argenteis*.

var. chrysocarpa.—A quick-growing climber with smallish, almost triangular or 3-lobed leaves, central lobe often prolonged with a few sharp lobes or notches; colour grey-green, with veins of a lighter shade. The variety *aurantiaca* is similar, but has yellow fruits.

var. conglomerata.—A distinct, slow-growing, erect variety, with small wavy leaves, and short internodes. Excellent for rambling over rockwork.

var. cuspidata minor.—A pretty variety with purplish stems and leaf stalks, and small uniformly 3-lobed and crenated leaves, of a rich glossy green, with whitish veins.

var. deltoidea.—A distinct Ivy with stout, purplish stems, and bluntly deltoid blackish-green leaves, changing to a dull purple-bronze in autumn. Suitable for walls.

var. dentata.—A large handsome form with leathery, heart-shaped, glossy leaves, sometimes distinctly toothed.

var. digitata.—A strong-growing Ivy with finger-shaped, blackish-green leaves, with whitish veins. Excellent for walls. The variety *caenwoodiana* is very similar if not identical with this.

var. donerailensis.—A very pretty form with small 3-lobed leaves, which assume a dull purple-brown in winter.

var. Glymi.—A distinct, wiry-growing form, with leaves varying from ovate to long wedge-shaped, many being obscurely 3-lobed, of a very glossy, deep, dull green. This variety is also known as *tortuosa*.

var. gracilis.—A graceful variety, with wiry, purplish stems, and 3-lobed leaves, light dull green changing to rich bronze in autumn. Good for covering walls, pillars, old stumps &c.

var. lobata major.—A strong, free-growing variety with deep glossy green, 3–5-lobed leaves.

var. lucida.—A quick grower, with deltoid or 3–5-lobed glossy leaves.

var. luteola.—A fine, strong-growing Tree Ivy, with broadly ovate, irregularly rhomboid, sometimes 3-lobed leaves, green in the centre, mottled with grey, and broadly edged with creamy yellow.

var. marginata.—A rather slow-growing variety with bluntly triangular leaves, dull green, edged with creamy white, brightly striped with red or pink in autumn.

var. marginata aurea has elongated triangular leaves, edged with pale orange-yellow, turning to red. Good wall Ivy.

var. marginata minor (H. Cavendishi).—Leaves smaller than in *marginata* proper; rather a slow grower, with weak stems.

var. marginata rubra (H. elegantissima; H. tricolor).—Leaves like those of *marginata* in shape, but with deep rosy-red edges in autumn. The colour disappears in spring. There is also a form called *marginata purpurea*.

var. marmorata.—A fine large-leaved form with irregular creamy-white blotches. The sub-variety *minor* is distinct, with smaller leaves.

var. palmata.—Leaves 3–5-lobed, dull, deep green, very much like *digitata* when young.

var. pellucida.—A vigorous variety, with red stems when young. Leaves bluntly 4-angled, mottled with green and white.

var. purpurea. — A climbing form with leathery leaves of a purplish colour, like *rægneriana*.

var. rægneriana.—A handsome vigorous form, with broadly heart-shaped, leathery, dark green leaves. The tree form is very striking.

var. rhombea.—A distinct form with medium-sized, rhomboid leaves, green, narrowly edged with creamy white.

var. sagittæfolia.—A free-growing, wiry-stemmed variety, usually with bluntly 3-lobed leaves, the central lobes projecting, sharply triangular; colour deep dull green, with a few blackish-bronze blotches, changing to rich purple-bronze in autumn.

var. sartifolia (H. cordata). — A distinct but not strong-growing variety, with roundish, triangular, or obscurely 3-lobed, dull green leaves, with obscure veins.

var. variegata.—A beautiful form of the Common Ivy with light green leaves, edged and blotched with creamy-white.

var. willsiana (H. nigra).—A dark-leaved form near *lobata major*, but much darker in colour in summer, and in winter almost black; veins less distinctly marked.

In catalogues many other names will be found, but as a good deal of confusion exists with the names, it is better to see the actual plants than to buy from catalogue descriptions.

LVII. CORNACEÆ—Dogwood Order

A genus consisting of 12 genera and 75 species of smooth or silky-haired trees or shrubs. Leaves opposite, or alternate, often stalked, leathery, entire, or occasionally lobed, angled, or serrate. Stipules none. Flowers usually small, regular, unisexual or hermaphrodite. Calyx-limb 4–5-toothed or lobed. Petals none, or 4–5, rarely more. Stamens 4 or 5. Ovary inferior, 1–4-celled. Fruit often drupe-like, with 1–4 stony seeds.

CORNUS (CORNEL; DOGWOOD).—This genus contains about 25 species of trees or shrubs, rarely herbs, with opposite, rarely alternate, stalked or nearly sessile, entire, or somewhat serrulate leaves, often glaucous beneath. Flowers hermaphrodite. Calyx-tube more or less bell-shaped, round, angled, or ribbed. Petals 4, oblong or ovate. Stamens 4. Disc cushion-like, or absent. Drupe ovoid or oblong.

All the shrubby Dogwoods are useful for shrubberies, and some of them look well in groups on grass against which the deep purple leafless stems look beautiful even in winter. The ground beneath may be carpeted with such dwarf and early-flowering plants as the Winter Aconite, Snowdrops, Crocuses, Scillas &c. to give a brightening effect to the surroundings.

Culture and Propagation.—They may be increased by seeds, layers, suckers, or cuttings in the autumn. The seeds may be sown in cold frames, and when well germinated the following spring the seedlings may be pricked out into light rich soil. Cuttings of the ripened shoots also root readily in most cases under a hand-light in autumn, but any that refuse to be increased in this way may be layered, or suckers from the base may be detached and replanted. *C. canadensis* and *C. suecica* are herbaceous and not shrubby kinds and require somewhat different treatment. They thrive in sandy peat, in rather shady spots; and are easily increased by dividing the roots in early autumn. The other species grow well in rich well-drained loam and are benefited by an annual mulching of well-rotted manure in autumn or winter.

C. alba (*White-Fruited Dogwood*).—A native of N. Asia and Siberia, about 10 ft. high, with slender, reddish branches and creamy-white flowers, succeeded by white fruits. The variety *Späthi* has beautiful bronzy leaves in spring, changing to green with an irregular gold margin in summer. *Gouchalti* is another variegated form. *Sibirica* is a dwarf variety with bright-coloured branches, and it also has a variegated form.

Culture &c. as above.

C. alternifolia.—A rare N. American species 20-30 ft. high, in a wild state, and on damp ground. Full-grown trees make beautiful pyramids, the branches of which spread out horizontally in tiers and are clothed with deep green bark. As may be seen from the characters of the genus given above, the leaves of most of the Dogwoods are opposite, but in this species, as the name indicates, they are alternate. It has pale yellow flowers, and bluish-black berries borne on bright red stalks.

Culture &c. as above.

C. asperifolia.—Also a native of N. America, with reddish-brown bark, small hairy leaves, and pearly white berries on reddish stalks.

Culture &c. as above. This species grows naturally in dry sandy places and likes warm sunny positions in our gardens.

C. californica.—A Californian species about 10 ft. high with smooth branches, hairy branchlets, and cymes of pretty white flowers, succeeded by white berries.
Culture &c. as above.

C. canadensis (*Bunch Berry ; Dwarf Cornel*).—A small N. American herbaceous plant 4–8 in. high, with upper leaves in whorls, ovate pointed, veined, on short stalks. Flowers in May, purplish-white, umbellate, shorter than the 4 white, ovate, pointed bracts. Berries red, conspicuous, sweet and palatable.

Culture and Propagation. — This is a suitable plant for the bog garden, or cool parts of the rockery. It may be easily increased by dividing the roots in early autumn.

C. capitata (*Benthamia fragifera*).—*Strawberry Tree.* — A beautiful tree native of N. India and China, often reaching a height of 40 ft. in Devonshire and Cornwall, and the S. of Ireland, the only parts where it appears to be hardy. Leaves 3–4 in. long, lance-shaped, pointed at each end, shortly stalked, roughish, with small adpressed down. Flowers from June to October, large, white, sessile, densely clustered in a round head. Fruit about the size of a very large Strawberry, clear red, composed of many more or less hexagonal fleshy drupes.
Culture &c. as above.

C. circinata (*Round-Leaved Dogwood*).—A native of the United States, 3–10 ft. high, with purple-greenish, warty branches, and large, roundish, oval, abruptly pointed leaves, 4–5 in. long, covered with hoary down beneath. Flowers in June, white, in flat cymes. Berries bright blue, about the size of a Pea.
Culture &c. as above.

C. florida (*Flowering Dogwood*). — A beautiful tree, 20–30 ft. high in the United States, with a very bitter bark. Leaves ovate pointed, with adpressed hairs on both surfaces, changing to shades of green, brown, buff, and yellow in autumn. Flowers in April and May, greenish-yellow, with 4 large white obcordate bracts. There is a form (*flore rubro*) in which the flowers are tinted with bright red.

Culture &c. as above. Only in the hottest parts of the country does *C. florida* grow to the best advantage, as the production of its fine flowers depends upon the thorough ripening of the wood.

C. Kousa (*Benthamia japonica*).—A beautiful Japanese species 3–8 ft. high, with ovate lance-shaped leaves, and clusters of small yellowish flowers, which, however, are surrounded by 4 large white ovate pointed bracts much more attractive in appearance and each about 1½ in. long. They appear in May and June.
Culture &c. as above.

C. macrophylla (*C. brachypoda*).—A Japanese species of moderate size, with crimson-stalked, elliptic ovate, green leaves, which change to brown tinted with rose in autumn. Flowers in early summer, white, in clusters. There is a variegated form, with white-edged leaves, but it is not particularly striking.
Culture &c. as above.

C. Mas (*C. mascula*). — *Cornelian Cherry.* — A beautiful free-growing Austrian species 10–15 ft. high, with oval-pointed leaves, rather downy on both surfaces. Flowers from February to April, yellow, appearing before the leaves, in umbels about equal in length to the 4-leaved involucre. The variety *variegata* has leaves variegated with silvery white; and *elegantissima* has the foliage beautifully marked with creamy white and tinged with red. Other forms are *aurea*, *fructu violaceo*, *lanceolata*, *nana* (or *pumila*), and *xanthocarpa*. Old trees flower and fruit freely, the fruit being an inch or more long, Cherry-like, bright red, yellow or violet. *C. officinalis* from Japan and Corea resembles the Cornelian Cherry in appearance, but may be easily distinguished by the tufts of rusty-coloured hairs in the axils of the main veins of the leaves.
Culture &c. as above.

C. Nuttalli.—A native of the forests of California and Oregon, where it attains a height of 50–60 ft., with leaves like those of *C. florida*. The flowers are surrounded usually by 6 large broad white bracts, each 2–3 in. long.

Culture &c. as above. Seedlings of this species are best grown on under the protection of cold frames for a year or two until comparatively large and sturdy, before planting in the open border.

C. paniculata. — A native of the United States 4–8 ft. high, with pale purple branches. Leaves ovate, pointed, smooth, hoary beneath. Flowers in July and August in loose cymes. Fruit white.

Culture &c. as above.

C. pubescens.—This shrubby Dogwood grows 4–12 ft. high, and is a native of Western N. America. It has smooth purplish branches more or less covered with hairs, and oval or ovate-acute leaves, green above, silky white beneath. The white flowers appear in summer, and are succeeded by white fruits.

Culture &c. as above.

C. sanguinea (*Common Dogwood; Dogberry; Prickwood*). — A native of Britain and north temperate regions, 6–8 ft. high, with dark red branches. Leaves 2–8 in. long, ovate, or ovate oblong, acute, downy. Flowers in June and July, creamy white, in dense terminal cymes, succeeded by small black berries. The variety *candidissima* has pale yellowish-green bark; *latifolia* has much broader leaves than the type; and *variegata* is an undesirable form with variegated foliage.

Culture &c. as above.

C. sericea.—A native of the United States 5–8 ft. high, with woolly branchlets, having a dull purple-coloured bark and ovate pointed leaves, clothed with rusty down beneath. Flowers in summer, white, in woolly depressed corymbs. Berries pale blue, roundish.

Culture &c. as above. This species prefers rather moist and boggy situations and may be grown on the banks of streams, ponds &c.

C. stolonifera (*Red Osier Dogwood*). A North American species 4–10 ft. high, spreading and increasing freely by prostrate or underground stems. Young shoots bright reddish-purple. Leaves ovate acute, downy, whitish beneath. Flowers in May, white, in small flat cymes. Berries white. *C. Baileyi*, a recently introduced Dogwood, native of S. Canada, is closely related but may be distinguished from this species by its erect habit, by the absence of creeping underground stems, by the duller brownish bark, the pearly-white fruits, and the white woolliness of the under surface of the leaves.

Culture &c. as above for *C. sericea.*

C. stricta.—A straight-growing species 8–15 ft. high, native of the United States, with reddish-brown branches. Leaves ovate, pointed, smooth, green on both sides. Flowers in June, white, in loose, flattish cymes. There is a form with white and yellow variegated leaves. The type is also known as *C. candidissima.*

Culture &c. as above.

C. suecica.—A native of Britain and Northern Europe, about 6 in. high, with opposite, sessile, ovate leaves. Flowers in June, dark purple, with 4 white bracts, which finally change to green. Berries red.

Culture and Propagation.—Like *C. canadensis* this herbaceous species may be grown in swampy or cool moist places and may be increased by dividing the roots in early autumn. It will also flourish in ordinary garden soil which is not particularly moist.

AUCUBA.—A genus of beautiful evergreen shrubs with opposite leaves, and small diœcious flowers in axillary panicles. In the male flowers the calyx is small, 4-toothed. Petals 4, ovate or lance-shaped. Stamens 4. Disc 4-angled, fleshy. Ovary none. Female flowers:—Calyx tube ovoid or nearly cylindrical, 4-toothed. Fruit a 1-seeded drupe about the size of the Sloe.

A. japonica.—A native of Japan 6–10 ft. high, with broadly ovate-lance-shaped leaves, pointed, toothed, leathery in texture, smooth and shining, pale green spotted and mottled with yellow. There are numerous more or less distinct forms of both the male and female kinds, all worth growing. *A. himalaica*, from the Himalayas, is probably a geographical form of *A. japonica.* A large-leaved form of it called *macrophylla* has orange-coloured berries. The distinct features of the following varieties are sufficiently indicated by the names: *albo-variegata*, *aurea*, *dentata*, *latimaculata*, *latifolia*, *angustifolia*, *pygmæa*, *salicifolia*, *sulphurea*, and *viridis*.

Culture and Propagation.—Aucubas are excellent shrubs for growing where others will not, as under trees. The pollen-bearing plants (*i.e.* those having stamens) should be planted near the others so that a good crop of bright red berries may be always relied upon. One male or pollen-bearing plant in the vicinity of several female or pistillate ones will be sufficient to ensure fertilisation by natural means. Where this is not the case, the crop of berries may be improved by collecting the pollen, and dusting it with a camel-hair brush on to the pistil when the tip of the latter is in a sticky condition.

Aucubas thrive in any garden soil, and may be increased by cuttings inserted in light sandy soil in spring or autumn in shady borders; or from seeds sown as soon as ripe in pans or boxes in cold frames. The lower branches may also be layered during the summer months and detached in autumn or spring when well rooted.

GARRYA.—A genus containing about 8 species of shrubs with 4-angled branches, and opposite entire or denticulate evergreen leaves. Flowers diœcious, in slender drooping catkins. Petals none. Stamens 4. Ovary 1-celled; styles 2. Berry ovoid, 1-2-seeded.

G. elliptica.—A beautiful Californian evergreen 8–10 ft. high, with elliptic, dark shining green leaves, hoary beneath. Flowers in mild winters as early as December, pale greenish-white or yellowish in drooping catkins so much like slender tassels that the name Tassel-bush has been suggested as a popular name. Berries black. The pollen plant is more elegant than the berry-bearing one.

Culture and Propagation.—This is the only species at present generally grown. In warm situations it makes a beautiful bush; but it is often grown on a wall. In cold localities it requires shelter. The plants thrive in rich sandy loam, and may be increased by seeds, or cuttings of the half-ripened wood inserted in sandy loam in August, and shaded from the sun until rooted. Also by budding or grafting on stocks of *Aucuba japonica*, and by layering the shoots in autumn, and detaching in spring when well rooted.

GRISELINIA.—A genus with 8 species of trees or shrubs, having alternate, often unequal-sided, oblong, nearly quadrate or lance-shaped, thick leathery entire leaves, spiny-toothed or angled. Flowers diœcious, in terminal panicles. Calyx teeth, petals, and stamens 5 in the male flowers. Berry ovoid.

Culture and Propagation.—Griselinias thrive in light rich loam, and may be increased by cuttings or layers like Aucubas. Both the species described below are natives of N. Zealand.

G. littoralis.—This grows 30 ft. high in a wild state. It has ovate or oblong leathery and glossy leaves, which remain on the plant during winter. It is a good plant for seaside places and seems to be hardy in the mildest parts of the country.

Culture &c. as above.

G. lucida.—Grows 10–12 ft. high, with obliquely ovate, unequal-sided leaves, distinctly veined beneath, and of a shining green above. The variety *macrophylla* is chiefly distinguishable from the type by its larger leaves.

Culture &c. as above.

NYSSA (Tupelo Tree).—A genus of more or less silky haired deciduous trees or shrubs with alternate stalked leaves which are entire or lobed or toothed when young. The small polygamous-diœcious flowers are borne in crowded heads, or short racemes at the ends of the axillary stalks. The male flowers have a somewhat cup-shaped calyx with 5 or more teeth. Petals and stamens 5 or more. Disc large, cushion-like, entire or lobed. The female flowers have a more or less bell-shaped calyx with 5 teeth. Petals none or very small. Stamens none, or rudimentary. Ovary 1-celled. Fruit an oblong drupe.

Culture and Propagation.—The Nyssas are rather handsome trees, but are very rarely seen outside botanic gardens. They are chiefly valuable for the autumn colouring of the foliage, which becomes a deep scarlet tint, and looks very fine wherever a good specimen is growing. The plants flourish in moist or marshy peat spots and may be planted near the edges of lakes, streams, ponds &c. Seeds do not often ripen in cultivation, but the plants may be increased by layering the branches in late summer or autumn.

N. aquatica (*Water Tupelo*).—A native of the Southern United States, where it attains a height of 30–50 ft. It has oval oblong entire leaves 3–4 in. long, glaucous beneath, and tinged with red in autumn. The flowers appear in April and May, and are succeeded by pairs of dark blue obovoid drupes about the size of a pea.

Culture &c. as above.

N. capitata (*Ogeechee Lime*).—This is also a native of the South United States, and grows about 30 ft. high. The leaves are more or less oval or oblong and downy beneath, and the flowers appear in April and May. The red Plum-like fruits appear in due course and are of an agreeably acid flavour.

Culture &c. as above.

N. sylvatica (*N. multiflora*).—*Black or Sour Gum; Pepperidge.*—A North American tree, 30–50 ft. high, with a habit somewhat resembling that of the Beech. The deep green oval leaves, 2–4 in. long, are downy when young but smooth when old, and are then remarkable for their brilliant crimson hues, which look effective. The flowers appear in May, and are succeeded by deep blue fruits.

Culture &c. as above. This species flourishes in deep rich loam, and will also grow slowly in poor gravelly soils.

N. uniflora.—A native of the swamps of Florida, where it grows 70–90 ft. high. The long-stalked oval tapering leaves, with 2–3 teeth on one side, are 5–6 in. long, and downy beneath. The small solitary flowers appear in May, and are succeeded by large deep blue fruits.

Culture &c. as above. This is the tallest of the Tupelo trees, but does not appear to be quite so hardy as the others.

Division II. *GAMOPETALOUS DICOTYLEDONS*
Series I. EPIGYNÆ (see p. 125).

LVIII. CAPRIFOLIACEÆ—Guelder Rose Order

An order consisting of 14 genera and about 200 species of shrubs or herbs with opposite, simple, or compound leaves and no stipules. Flowers usually corymbose or cymose, and often sweet-scented. Calyx-limb superior, 3–5-toothed or lobed, usually with 2 or more bracts at the base. Corolla regular or irregular, gamopetalous or polypetalous, often 2-lipped. Stamens 4–10, epipetalous. Fruit a berry, drupe, or dry capsule.

SAMBUCUS (ELDER). — A genus containing 10–12 species of ornamental trees or shrubs, rarely herbs, with pinnate leaves, and large compound cymes of small white, yellow, or pinkish flowers. Calyx limb 3–5-lobed or toothed. Corolla rotate or somewhat bell-shaped, with 3–5 usually imbricated lobes. Stamens 5. Fruit a berry-like drupe with 3–5 one-seeded stones.

Culture and Propagation.—The Common Elder (*S. nigra*), as everyone knows, grows well in any soil with plenty of sunshine above and moisture beneath. Its more ornamental varieties and other species do equally well under similar conditions, and when judiciously planted lend a charm to the landscape. Herbaceous kinds like *S. Ebulus* may be increased by dividing the rootstocks in early autumn or spring. The shrubby kinds increase easily from cuttings inserted in sandy moist soil in shade. Seeds also germinate freely, not only in the case of the Common Elder, but also the others. They may be sown as soon as ripe out of doors in the milder parts of the country, or in cold frames in more unfavourable localities.

S. canadensis.—A handsome Canadian Elder 6–12 ft. high, with pinnate leaves composed of 4–5 pairs of leaflets and an odd one, the lowest pair being often cut into two or three lobes. The whitish flowers appear about June and July, and are borne in long-stalked flattish clusters, being afterwards succeeded by purple-black fruits.

Culture &c. as above. A good plant for placing near the margins of lakes, streams &c.

S. Ebulus (*Dane's Blood; Dwarf Elder &c.*). — A native of Europe, temperate Asia and N. Africa, and also the British Islands, whither it is supposed to have been introduced by the Danes. It has stout ribbed and grooved herbaceous stems 2–4 ft. high, and leaves with 4–6 pairs of oblong-lance-shaped, serrate leaflets 4–6 in. long. Flowers in July and August, white tipped with pink, in cymes 3–4 in. across. Berries small, globose, black. This plant, which emits a somewhat obnoxious smell when bruised, is useful for rough shrubberies, banks &c. It may be increased by dividing the roots in early autumn or in spring.

Culture &c. as above.

S. glauca (*S. californica*).—A beautiful Elder, native of California and other parts of Western America, where it grows 30–50 ft. high. It very much resembles our Common Elder (*S. nigra*) in the foliage, having lance-shaped serrate leaflets. The whitish flowers appear in early summer, and are succeeded by blackish fruits which are remarkable for the thick bluish-white bloom that covers the surface, and suggested the specific name.

Culture &c. as above.

S. nigra (*Common Elder; Boon Tree; Bur Tree*).—A well-known British tree 20–25 ft. high, having leaves divided into 2–4 pairs of ovate-oblong, or lance-shaped, serrate leaflets 1–3 in. long. Flowers in May and June, white, in flat-topped cymes 4–6 in. across, succeeded by small black berries, so much used for making Elderberry Wine in many parts of the country.

There are several fine-leaved varieties, among which may be mentioned:—*foliis aureis*—the Golden Elder, with yellow leaves. A beautiful plant which may be kept dwarf and bushy by pinching out the tips of the young shoots; *laciniata*—Parsley-leaved Elder, a handsome form with finely cut leaves; *monstrosa*, with the flowers increased in parts, branches striped, and fruits irregular; *rotundifolia*, with trifoliolate leaves and roundish leaflets. There are also silver and golden variegated-leaved forms, and forms with white (*leucocarpa*), and yellowish-green fruits (*virescens*).

Culture &c. as above.

S. racemosa (*Hart's Elder; Scarlet-Berried Elder*).—A large shrub 10–20 ft. high, native of S. Europe and Siberia, with large pinnate smoothish pale green leaves; leaflets 5, oblong pointed, serrated, unequal at the base. Flowers in April and May, white, in panicles, succeeded by scarlet fruits in favourable places. The variety *serratifolia* is an elegant shrub with deeply cut serrated leaflets. There are also forms called *laciniata* with jagged leaflets, and *plumosa* with deeply pinnatifid ones. The variety *foliis aureis* has yellow foliage; *rosæflora* has deep pink or purple-tinted blossoms; *spectabilis* has purer white flowers than the type; and *tenuifolia* is a handsome form with the leaf segments cut into narrow strips.

Culture &c. as above.

VIBURNUM.—A genus containing about 80 species of ornamental, deciduous or evergreen trees and shrubs, with opposite, rarely whorled leaves, stalked, entire, serrate or toothed, always simple, with or without stipules. Flowers white or pinkish, jointed on the pedicels, in terminal or axillary cymes, corymbs, or panicles, hermaphrodite, or the outer ones much larger and sterile (as in *Hydrangea*). Calyx-tube turbinate or ovoid; limb short, equally 5-toothed. Corolla regular, rotate, bell-shaped or tubular, with 5 equal imbricated lobes. Stamens 5, epipetalous. Fruit a 1-seeded, dry or fleshy, round or flattened drupe.

Culture and Propagation.—Most of the Viburnums are easily grown in any fairly good soil with plenty of moisture at the root in summer. They are increased by layers; or by cuttings of the half-ripened young shoots inserted in sandy soil in a cold frame, or under handlights in a shady place. In autumn or winter a little pruning or thinning out of dead or useless branches may be needed, and a good top-dressing of manure will be highly beneficial to the plants.

The genus is familiar to almost every one by means of the Snowball Tree or Guelder Rose (*V. Opulus*) and the Laurustinus (*V. Tinus*). But there are several other fine species in cultivation, all worth growing either in borders or shrubberies, or in groups by themselves on grass &c.

V. acerifolium (*Dockmackie*).—A pretty compact shrub about 4 ft. high, native of the N.E. United States. Leaves roundish, Maple-like, somewhat coarsely toothed and 3-lobed, downy beneath, 4–5 in. across, becoming a bright claret colour in autumn. Flowers in May and June, white, on slender stalked cymes 2–3 in. across, with very few sterile blossoms, or none. Fruit black, oval.

Culture &c. as above.

V. cassinoides.—A compact shrub about 6 ft. high, native of swampy places in N. America. Leaves 3–4 in. long, thick, leathery, ovate-oblong. Flowers in June, yellowish-white, in flat cymes 4–5 in. across. Fruit handsome, rosy at first, changing to bluish-black.

Culture &c. as above.

V. coriaceum.—A recently introduced Chinese species with dark evergreen leaves, 3–5 in. long, pointed, smooth, distantly toothed, somewhat resembling those of a green Aucuba. Flowers in summer, white, almost tubular, in small terminal corymbs.

Culture &c. as above.

V. cotinifolium (*Indian Wayfaring Tree*).—A pretty Himalayan shrub 5–10 ft. high, with ovate or elliptic leaves. almost entire. rarely coarsely crenate, usually woolly beneath. Flowers in June, white, in dense terminal corymbs 2–3 in. across.

Culture &c. as above.

V. dentatum (*V. montanum*). — *American Arrow Wood.* — A handsome shrub 5–10 ft. high, native of the Eastern United States. Leaves 2–4 in. across, broadly ovate or roundish, strongly veined, deeply and regularly toothed, often bearded in the axils of the veins. Flowers in June, white, all small and fertile, in terminal cymes 3–4 in. across. Fruit dark blue or purple, small, ovoid, rarely ripened in this country. There is a variegated form.

Culture &c. as above.

V. dilatatum.—A handsome Japanese shrub 6–10 ft. high. Leaves 3–5 in. long, varying from roundish to obovate, usually abruptly and bluntly pointed, coarsely and unevenly toothed, slightly hairy, on stalks about ½ in. long. Flowers in June, white, ⅓ in. across, in branched cymes 2–6 in. across. Fruit brilliant red. This species is still very rare.

Culture &c. as above.

V. erosum.—A sturdy Japanese and Chinese shrub 5 ft. or more high, with much-forked branches, and ovate-pointed leaves, 2–4 in. long, with small, linear stipules. Flowers in summer, greenish-white, in small clusters. Fruit red.

Culture &c. as above.

V. furcatum (*V. cordifolium*).—A rare and handsome Japanese shrub, 12–15 ft. high, with large, broad, almost round leaves, which assume brilliant scarlet and reddish-purple hues in autumn, and constitute the chief ornamental value of the plant.

Culture &c. as above.

V. Lantana (*Wayfaring Tree*). — A beautiful British, European and temperate Asiatic tree 12–15 ft. high or more. Leaves broadly oblong, heart-shaped, 2–4 in. long, serrulate, wrinkled, rich red in autumn, covered with a pale down beneath, also on the young branches. Flowers in May and June, white, ¼ in. across, in flat, stoutly rayed cymes. Fruit at first red, afterwards black. There is a rather valueless form, with variegated white and yellow leaves.

Culture &c. as above.

V. lantanoides (*V. alnifolium*). — *Hobble Bush; Moosewood.* — A beautiful N. American shrub or small tree, with roundly ovate or heart-shaped leaves, 3–6 in. across, bluntly pointed, closely serrated, beautifully claret-tinted in autumn, with a rusty down on the veins beneath, as well as on the stalks and young branches. Flowers in May, white, the outer ones sterile, an inch or more across, in broad, flat, sessile cymes. Fruit at first coral-red, afterwards dark-purple or black.

Culture and Propagation. — This species does not succeed in all places. It probably requires a moist and somewhat shady position. It is said to grow well grafted on stocks of *V. Lantana.*

V. Lentago (*V. nitidum*). — *Sheep Berry; Sweet Viburnum.*—A handsome tree 15–30 ft. high, native of Eastern N. America, with long-stalked, shining, ovate or lance-shaped leaves, tapering rather abruptly to a fine point, and minutely and regularly toothed on the margins. Flowers from May to July, creamy white, all fertile, in a sessile cyme. Fruit bluish-black, edible, sweet, oval, about ½ in. long.

Culture &c. as above.

V. macrocephalum (*V. Fortunei*). — This beautiful Chinese shrub is said to reach a height of about 20 ft. Leaves bluntly ovate, 2–4 in. long, denticulate, with a roughish down on the under surface. Flowers in June, all large and sterile, 1–1½ in. across, pure white, borne on pyramidal trusses.

The variety *Keteleeri* is the wild type, from which the cultivated *V. macrocephalum* has sprung. It is like the sterile plant in habit, but the centre of the flower trusses have small, fertile flowers, the outer ones only being sterile.

Culture &c. as above.

V. molle.—A vigorous shrub 6–12 ft. high, native of the S.E. United States, and closely related to *V. dentatum.*

Leaves broadly oval, obovate or ovate, coarsely crenate or toothed, very downy beneath. Flowers in July, white, in downy cymes. Fruit purple or blue, ovoid, small, but larger than that of *V. dentatum.*

Culture &c. as above.

V. nudum (*American Withe Rod*).—A native of the N. United States, 6–10 ft. high, and closely resembling *V. cassinoides.* Leaves thick and glossy, oval, oblong or lance-shaped. Flowers in May and June, white, all fertile, in shortly stalked cymes. Fruit black when ripe, sweet, ovoid, ¼ in. long. There is a variety called *Claytoni* but very rarely seen.

Culture &c. as above.

V. odoratissimum (*V. Awafuki*). — A handsome evergreen Chinese shrub, 6–10 ft. high, with elliptic, leathery, shining green leaves 3–6 in. long, entire or somewhat sinuate-toothed. Flowers in May, small and dull white, but very fragrant, in corymbs 2–4 in. high.

This species is only hardy in the southern parts of England and Ireland. In cooler places it requires the shelter of a south wall.

Culture &c. as above.

V. Opulus (*V. edule; V. Oxycoccus*).—*Guelder Rose; Snowball Tree; Cranberry Tree; Dog Rowan Tree; Marsh* or *Water Elder &c.*—A handsome shrub 6–15 ft. high, native of the British Islands, Europe, N. and W. Asia, and N. America. Leaves 2–3 in. long, 3-lobed, the young ones downy; lobes unequal, serrated. Flowers in June and July, creamy white, in rounded cymes 2–4 in. across. Fruits red, globose, translucent, ⅓ in. in diameter, very handsome in autumn.

The variety *sterile* is best known as the Guelder Rose or Snowball Tree, and is remarkable for having nearly all pure white, sterile flowers, which cannot of course produce the beautiful fruits of the less showy form.

There is a variety called *fructu luteo,* with yellow instead of red berries; *nanum,* a curious dwarf plant, 1–2 ft. high, forming dense, rounded tufts, but does not flower freely. There is also a form (*foliis variegatis*) with white and yellow variegated leaves.

Culture &c. as above.

V. plicatum.—A beautiful Japanese shrub 4–6 ft. high with dark green, oblong-elliptic or roundish, coarsely serrated, plaited leaves 3–5 in. long, smooth above, downy beneath. Flowers in May and June, pure white, all sterile, in globular heads 3 in. or more across, at the tip of almost every branch, and resembling the Guelder Rose. Botanically *V. plicatum* is the sterile form of *V. tomentosum.* When well established *V. plicatum* is perhaps the finest species in cultivation and is very hardy.

Culture &c. as above.

V. prunifolium (*Black Haw*).—A native of the Central and Southern United States 6–15 ft. high. Leaves dark shining green like those of a Plum, finely and sharply serrated, often assuming beautiful red or purple tints in autumn. Flowers in May and June, pure white, succeeded by bluish-black fruits.

Culture &c. as above.

V. pubescens.—A somewhat compact shrub 6 ft. or more high, with roundish, coarsely toothed leaves 1½–2½ in. long on purplish, downy stalks. Flowers in June, creamy white, tubular, in flat cymes. Fruits oval, ⅓ in. long, bluish-black. It is a native of N. America.

Culture &c. as above.

V. Sieboldi (*V. reticulatum*).—A strong sturdy Japanese bush with dark glossy green, obovate leaves 2–5 in. long, strongly veined and coarsely toothed towards the apex. Flowers in early summer, creamy white, all fertile, in flat terminal cymes. Fruit black, about 1 in. long.

Culture &c. as above.

V. Tinus (*Laurustinus*).—An ornamental evergreen 8–10 ft. high, with ovate oblong entire leaves, glandular hairy beneath. Flowers from Christmas to Easter, rosy in bud, white when open, in flat trusses 2–3 in. across. Fruits dark blue, rarely produced. It is a native of the Mediterranean region.

Culture &c. as above. Except in severe winters this species is hardy in most parts of the country, but prefers sunny situations. If cut down by frost new branches are almost sure to spring up again. There are several varieties, including: *Frœbeli,* with pale green leaves and white flowers; *hirtum,* which flowers in autumn and winter and has oval oblong leaves, hairy beneath; *lucidum* flowers in spring, leaves large, shining, smooth. There is a sub-variety of this with variegated leaves; *strictum*, an erect-growing kind, of which there is also a variegated form; *virgatum*, an Italian variety with oblong lance-shaped leaves, hairy beneath, and on the margins. There are others, such as *purpureum*, *pyramidale*, *rotundifolium*, *variabile* &c. more or less distinct.

V. tomentosum.—This is the fertile flowering form of *V. plicatum*, from which it differs in having more hairy, oblong, serrate, roughish leaves, and only the outer flowers large, showy and sterile, those in the centre being smaller and with stamens and pistil.

Culture &c. as above.

SYMPHORICARPUS (*St. Peter's Wort; Snowberry Tree*).—A genus containing about 6 species of handsome dwarf deciduous shrubs, with opposite, shortly stalked, ovate, entire or sinuate-toothed leaves. Flowers small in short axillary racemes or spikes. Calyx tube nearly round, limb irregularly 4-5-toothed. Corolla funnel- or bell-shaped, 4–5-lobed. Stamens 4-5. Drupes berry-like, white or red, ovoid or round, fleshy, 4-stoned.

Culture and Propagation.— Snowberries grow well in ordinary garden soil and may be increased by suckers which are freely produced. Seeds may be sown in the open border when ripe in a prepared spot, and the seedlings may be transplanted in mild weather the following spring or autumn. But the plants are hardly worth this trouble. They are scarcely suitable for the flower border or shrubbery but make excellent covert plants. They are very graceful looking, with the green leaves and slender branches swaying gently in the breeze.

S. occidentalis (*Wolf Berry*).— A native of N. America, 3–5 ft. high. Leaves ovate, entire or sinuate-toothed, or lobed on the young shoots, downy beneath. Flowers in summer, white tinged with rose, bearded within. Closely related is *S. Heyeri*, a native of Colorado, with rhomboid prominently veined leaves of firm texture, and pretty rose-coloured flowers.

Culture &c. as above.

S. racemosus (*Common Snow Berry*). A N. American shrub 4-5 ft. high, with oval entire leaves, glaucous beneath. Flowers from July to September, rosy, in loose spikes at the ends of the branches; corolla bearded inside. Berries white, almost as large as a Barcelona Nut, persistent during the winter. There is a variety called *pauciflorus* with fewer flowers.

Culture &c. as above.

S. vulgaris (*Coral Berry; Indian Currant; Common St. Peter's Wort*).—A North American shrub 3–6 ft. high, with blunt elliptic-ovate, glaucous leaves, downy beneath. Flowers from July to September, red and yellow, in small dense clusters in the axils of the leaves; corolla slightly bearded. In winter one of the chief attractions of this shrub is the white berries, which are borne in great abundance and are very conspicuous. There is a pretty variety (*foliis variegatis*), having the leaves beautifully variegated with green and yellow. This species is now known as *S. orbiculatus*.

Culture &c. as above.

ABELIA. — A genus of very ornamental deciduous or evergreen shrubs with stalked opposite leaves, and terminal or axillary clusters of flowers. Calyx-lobes leafy or linear. Corolla funnel-shaped, 5-lobed. Stamens 4, equal; or 2 long and 2 short. Ovary 3-celled. Fruit a leathery, 1-seeded berry.

Culture and Propagation. — Abelias are hardy only in the southern parts of England and Ireland, although in more northern parts they may survive hard winters with a little protection against sunny south walls. They thrive in a mixture of sandy peat and loam, and may be increased by layers; or by cuttings in sandy soil in summer, under glass, or in a cold frame.

A. chinensis (*A. rupestris*). — A deciduous hairy Chinese shrub about 5 ft. high with small oblong leaves. Flowers in autumn, small, pink, in pairs at the tips of the branches, sweet-scented; sepals leafy, reddish-tinged. The variety *grandiflora* is a garden seedling with rosy white flowers.

Culture &c. as above.

A. floribunda.—A free-flowering, evergreen Mexican species about 3 ft. high, with ovate oblong leaves. Flowers in March, rose-purple, 2 in. long, in drooping axillary clusters.

Culture &c. as above. This is rather tender in northern parts of the kingdom and is best grown against a south wall in such localities.

A. serrata.—A fine Chinese evergreen shrub about 8 ft. high, with serrated leaves. Flowers in March, pale red, sweet-scented, large.

Culture &c. as above.

A. spathulata. — A free-flowering Japanese evergreen shrub 2–3 ft. high. Leaves about 2 in. long, elliptic lance-shaped, bluntly pointed, sinuate-toothed, smooth above, downy beneath, edged with purple. Flowers in April, about 1 in. long, in pairs, white with yellow blotches in the throat of the corolla.

Culture &c. as above.

A. triflora.—A pretty Himalayan shrub 2–3 ft. high, with ovate lance-shaped pointed leaves 2–3 in. long. Flowers in summer, ½ in. across, in threes in large clusters in the axils of the leaves and at the ends of branches; they are pale yellow inside with a pink or purple tube, and white, oblong, wavy, reflexed petals.

Culture &c. as above. When well grown this is a very striking plant when covered with masses of its sweet-scented flowers.

A. uniflora. — A handsome Chinese species, with broadly lance-shaped thick deep green shining leaves, somewhat like those of the common Myrtle, and large pink and white bell-shaped flowers drooping from the branches in August. Calyx lobes leafy and tinged with brown.

Culture &c. as above.

LINNÆA.—A genus with only one species, native of Britain and the N. Hemisphere.

L. borealis. — A pretty trailing sub-shrubby creeping evergreen with roundish or ovate, crenate, slightly hairy leaves. Flowers in June and July, flesh-coloured, twin, drooping, fragrant, on axillary peduncles. Corolla bell-shaped, 5-parted, with a cylindrical tube. Stamens 4, two short and two long.

Culture and Propagation.—This is an excellent plant for moist parts of the rockery or in cool borders. It thrives in peaty soil, and may be increased by division in early autumn or spring.

LONICERA (Honeysuckle). — This genus contains about 80 species of erect, trailing, or climbing shrubs, with opposite, simple, entire or lobed, deciduous or evergreen leaves. Flowers often fragrant, cymose, axillary or capitate, sometimes adhering by the ovary in pairs. Calyx-limb of 5 often unequal teeth. Corolla tubular or bell-shaped, gibbous in some species at the base, limb oblique or 2-lipped. Stamens 5. Fruit a fleshy, 2–3-celled berry.

Culture and Propagation.—Loniceras are charming plants for covering walls, arbours, trellises &c. They love sunshine, and a light rich soil, and should therefore not be planted, as is often seen, in deep shade at the base of a shady tree, where the roots have to struggle for existence on the scanty remnants left by those of the tree.

In some of the deciduous species a little judicious pruning is occasionally required. The old wood should be thinned out to induce new growths to develop, thus giving a chance of greater profusion of flower, and also keeping the plants well furnished with leaf-bearing shoots.

Loniceras root readily in autumn from cuttings of the ripened young shoots placed in sandy soil under a handlight or in a cold frame. They may also be obtained by layers or from seeds. The latter may be sown when ripe or in spring in cold frames, afterwards pricking the seedlings out when large enough into light rich soil.

L. Alberti. — A distinct and pretty smooth branching shrub 2–3 ft. high, native of Eastern Turkestan, with slender dependent branches. The rather blunt linear oblong leaves about an inch long resemble those of Lycium (see p. 691), and have a glaucous hue. The sweet-scented rosy-lilac flowers, with an almost regular 5-parted corolla, appear in June in pairs in the axils of the leaves.

Culture &c. as above.

L. alpigena.—This species grows about 6 ft. high and is a native of the mountains of Central and S. Europe, and the Himalayas. The erect stems are furnished with oval lance-shaped acute, shortly stalked leaves, the margins of which are slightly toothed. The flowers are of a somewhat dull red, and appear in April and May. There is a dwarf variety (*nana*) about a foot high, which makes a useful rock plant, and is remarkable for its shining crimson Cherry-like fruits in August and September.

L. webbiana, from the Himalayas, is closely related to this species. It has large oblong-elliptic leaves, abruptly pointed, and 2-lipped yellowish-green flowers tinged with purple outside.

Culture &c. as above.

L. angustifolia.—A rather handsome deciduous shrub 4–6 ft. high, native of the Himalayas. It has slender branches and narrow lance-shaped leaves rather more than an inch long, and fringed with hairs on the margins. The small tubular pale yellow flowers appear in April and May, and are borne in pairs at the end of a slender drooping stalk issuing from the leaf axil.

Culture &c. as above.

L. bella. — A very handsome bush Honeysuckle about 4–6 ft. high, said to be a hybrid between the Japanese *L. Morrowi* and *L. tatarica*. It retains its leaves until quite late in autumn, and in April and May produces its soft yellow or rose-tinted flowers in great abundance. These are afterwards followed, about July, with showy masses of scarlet fruits resembling Red Currants. The variety *albida* with whitish blossoms is an excellent plant.

Culture &c. as above.

L. Caprifolium.—A native of Central and S. Europe and W. Asia, but now naturalised in the copses of Cambridge and Oxford. Upper leaves united by very broad bases, oblong or triangular, glaucous beneath; lower ones stalked, broadly ovate or oblong. Flowers in May and June, yellowish, with a purplish tube 2 in. long, highly fragrant, borne in capitate whorls. Berries globose, scarlet.

Culture &c. as above.

L. confusa (*L. halleana*).—A slender twining Japanese species with ovate, deep green leaves, sometimes ruddy tinted. Flowers in summer, pure white at first, changing to yellow, in pairs from the axils of the leaves at the tips of the young shoots. This plant is now regarded as a variety of *L. japonica*.

Culture &c. as above.

L. etrusca.—A deciduous European climber with obovate, blunt, downy leaves, lower ones shortly stalked, upper ones united at the base, acute. Flowers in May and June, purple outside, yellow within, sweet-scented, in verticillate heads at the ends of the branches. *L. semperflorens* is probably a variety of this.

Culture &c. as above. Requires to be grown in warm sheltered spots.

L. flava (*L. Fraseri*).—A pretty N. American climber, with smooth, thickish, obovate or oval, very pale green leaves, glaucous on both sides, the 2–4 upper pairs united into round cup-like disks. Flowers in June, bright yellow; tube of the corolla somewhat gibbous.

Culture &c. as above.

L. flavescens.—This shrubby Honeysuckle is also known in some gardens as *L. webbiana*, the true plant of which, named by Wallich, is probably not in cultivation, or very rarely seen. The plant here described is said to be a native of British Columbia. It has lance-shaped tapering leaves, ovate acute bracts, and united bracteoles, which conceal the base of the almost regular corolla. The flowers appear in early summer and vary in colour from sulphur-yellow to citron-yellow, and are slightly covered with glandular hairs.

Culture &c. as above.

L. flexuosa (*L. brachypoda*).—A deciduous Japanese purple-stemmed climber, with smooth, ovate-oblong acute leaves on short stalks, and ruddy tinged. Flowers in June and July, yellow or purplish, nearly sessile, sweet-scented. This is now regarded as a variety of *L. japonica*.

Culture &c. as above.

L. fragrantissima.—A beautiful Chinese climber, with oblong ovate acute leaves rounded at the base, nearly smooth and almost evergreen, except in severe winters, when they drop. Flowers in January and February, creamy-white or pale yellow, sweet-scented, nearly 1 in. across, tube short, mouth expanded, appearing before the leaves are developed.

Culture &c. as above.

L. grata. — A vigorous climber from the New England States, with broad, glaucous, almost evergreen leaves. Flowers in May in clusters, whitish with a purple tube fading to yellow, sweet-scented. This plant is now regarded as a form of *L. Caprifolium*.

Culture &c. as above.

L. hispida (*L. bracteata*).—A Himalayan Honeysuckle 2–3 ft. high, with hairy branches and shortly stalked oblong acute ciliate leaves, 1½–2 in. long, smooth on both surfaces. The drooping greenish-white flowers about 1 in. long appear in early summer, in pairs, having large ovate bracts, and are followed in autumn by purple-coloured berries.

Culture &c. as above.

L. implexa (*L. balearica*).—A native of the Balearic Isles, Sicily &c., with roundish evergreen leaves. The flowers are purple outside and yellow within, and assume a deeper yellow tinge with age.

Culture &c. as above. This is rather too tender for northern parts of the kingdom, and even in good localities it cannot be regarded as a vigorous grower.

L. japonica (*L. chinensis*).—A slender hairy Japanese and Chinese climber with stalked, ovate-acute, hairy leaves, pale beneath. Flowers from July to September, about 1 in. long, red, hairy outside, white within, sweet-scented, in pairs at the tips of the young shoots. The variety *aureo-reticulata* is an elegant climber with more or less elliptic leaves beautifully netted with golden yellow.

Culture &c. as above.

L. Kesselringi.—A dwarf and much-branched shrub, native of Kamtschatka. Leaves more or less elliptic lance-shaped, green above, grey beneath. The flowers appear in pairs in the leaf axils, and are red outside, red and white inside, with a bearded throat.

Culture &c. as above.

L. Korolkowi (*L. floribunda*). — A native of Turkestan with small grey-green ovate leaves and numerous pale rose-coloured blossoms borne on short twigs. There seems to be another plant under this name having yellowish-white flowers and orange-red fruits.

Culture &c. as above.

L. Maacki.—A rather pretty Manchurian shrub with oblong acute leaves, and almost stalkless white flowers produced in the leaf axils in early summer. The corolla is less than an inch in length, and is 2-lipped, the lower lip being shortly 4-lobed.

Culture &c. as above.

L. Morrowi.—A handsome Japanese Honeysuckle resembling *L. ruprechtiana*, from which it differs in having smaller and paler green leaves. It makes a fine bush, and is very ornamental when covered with its showy red berries.

Culture &c. as above.

L. Periclymenum (*Woodbine* or *Honeysuckle*). — A native of British hedges and copses, with climbing twisted branches. Leaves deciduous, 1–3 in. long, ovate or oblong, glaucous beneath, lower ones shortly stalked, upper ones sessile. Flowers from June to September, 1–1½ in. across, glandular downy, dirty red outside, yellow inside. Berries round, crimson. The variety *serotina*, known as the 'Late Dutch Honeysuckle,' produces its deeper red flowers in autumn. *Belgica*, known simply as the 'Dutch Honeysuckle,' is a stronger-growing plant than the type, and has flowers red outside, yellow within. *Quercifolia*, the 'Oak-leaved Honeysuckle,' has leaves sinuated like those of an Oak.

Culture &c. as above.

L. quinquelocularis (*L. diversifolia*). A Himalayan species with elliptic or ovate leaves, downy beneath, and ciliate on the margins. The yellowish flowers appear in summer and are succeeded by white berries.

Culture &c. as above.

L. ruprechtiana.—A distinct and handsome Honeysuckle, native of Manchuria. The leaves are pale green, somewhat downy beneath. The clusters of pale yellow flowers tinged with rose are borne in great abundance in early summer, and are in due course succeeded by bright scarlet translucent berries on gracefully arching stems. There are several variations of this species, the chief difference being the depth of the colouring in the flowers.

Culture &c. as above.

L. sempervirens (*Trumpet Honeysuckle*). — A beautiful North American evergreen climber with obovate or ovate smooth leaves, glaucous beneath; upper ones united at the base. Flowers in spring and summer, about 1 in. long, beautiful scarlet outside, yellow within. There is a variety called *minor* with smaller blossoms.

Unfortunately this species is not perfectly hardy in all parts of the country, hence its presence in cool greenhouses. It grows well in southern parts, but in other places requires the protection of a sunny south wall,

Culture &c. as above.

L. Standishi.—This Chinese climber is closely related to *L. fragrantissima.* It has ovate-oblong or ovate-lanceolate leaves, fringed at the edges, and with hairy flower stalks. Flowers early in the year, white tinted with purple. sweet-scented. This is often confused with *L. fragrantissima*, but it is a purely deciduous species, and does not open its blossoms so soon.

Culture &c. as above.

L. tatarica. — A deciduous twiner, native of Tartary. Leaves heart-shaped ovate, somewhat acute. Flowers in April and May, in pairs, rosy; corolla tube rather gibbous at the base. Fruits black, nearly round when young, but at length united at the base. There is a variety *albiflora* with white flowers; *micrantha* with small pink flowers changing to yellow, and succeeded by small red berries; and *rubriflora* with purple-red flowers.

Culture &c. as above. This is one of the hardiest and best flowering of Honeysuckles, but it has a tendency to lose its leaves rather too early towards the end of summer.

L. Xylosteum (*Xylosteum dumetorum*). *Fly Honeysuckle.*—An erect deciduous shrub native of Europe and N. Asia, but naturalised in parts of the eastern and southern counties of England. Leaves 2-3 in. long, shortly stalked, ovate or obovate. Flowers in May and June, ½ in. across, yellow, downy, sessile. Berries small, crimson. The variety *leucocarpum* has white berries; *melanocarpum*, black; and *xanthocarpum*, yellow.

Culture &c. as above.

LEYCESTERIA (Flowering Nutmeg).—This genus contains only one species:—

L. formosa.—A handsome deciduous shrub 4-6 ft. high, native of the temperate Himalayas, with hollow stems, and rather large, ovate-lance-shaped, pointed, stalked, smooth, entire leaves. Flowers in summer, small, white or purplish, in short leafy drooping racemes, at the ends of the branches. Calyx-lobes linear, unequal. Corolla funnel-shaped, 5-lobed, gibbous above the base. Bracts large, leafy, purplish, downy, generally 6 under each whorl of flowers. Berries dull purple, many-seeded. There is a form with variegated foliage.

Culture and Propagation. — This species thrives in good garden soil, and in mild districts will retain its foliage. It may be increased by cuttings of the young shoots in spring, or by older ones in autumn under a handlight or cold frame. Seeds may also be sown in spring or in autumn as soon as ripe in cold frames. The seedlings when large enough may be pricked out into light rich soil in warm and sheltered parts of the garden. Pheasants are very fond of the berries.

DIERVILLA (Weigela). — Bush Honeysuckle. — A genus of handsome flowering shrubs, with opposite sessile or stalked leaves, and showy flowers in axillary and terminal clusters. Calyx-tube very slender, produced above the ovary. Corolla funnel- or bell-shaped, nearly regular. Stamens 5. Style simple, slender, protruding, with a capitate stigma.

Culture and Propagation.—Diervillas are among the best and showiest of ornamental flowering shrubs, and fortunately are easily grown in any good soil in rather moist and partially shady situations. They are easily increased by cuttings in spring or autumn inserted in sandy soil under a handlight, or from the freely produced suckers. In groups on grass or in shrubberies Diervillas are always effective when in leaf and blossom, although owing to their deciduous nature they are in a leafless state for a short period of the year. During the winter months an opportunity is given to cut out any old or decaying branches, or others which may be crowding the centre too much so as to prevent the admission of sunshine and free circulation of air. A good mulching of well-decomposed manure in autumn or winter will be of great assistance in keeping the plants in a vigorous, healthy, and free-flowering condition.

There seems to be a good deal of confusion in regard to the naming of the various species. In the Kew herbarium there are specimens labelled *D. grandiflora*, *D. florida*, *D. japonica*, *D. versicolor*, *D. floribunda*, and *D. hortensis*, all more or less alike, the chief difference being in the size of the leaves. The kind labelled *grandiflora* has larger and wider leaves than the others, but to make the confusion worse, this plant has now been referred to a hitherto almost unheard-of species, *D. coræensis*, by the 'Kew Index.'

D. grandiflora (*D. amabilis*). — A beautiful Japanese shrub about 8 ft. high, with leaves strongly veined on the under side. Flowers in early summer, pink. There are several varieties, among which may be mentioned: *Abel Carrière*, *Isolineæ*, *striata*, *Van Houttei*, *Grœnowegenei* &c., but some of these and others mentioned in catalogues have become intermixed by the crossing of *D. grandiflora* and *D. rosea.* The variety called *præcox* has deep rosy flowers with a carmine and yellow throat, and is a very valuable shrub owing to the fact that it comes into bloom early in May, nearly a month before the other forms.

Culture &c. as above.

D. hortensis.—A Japanese shrub 4–5 ft. high, with stalked, ovate, pointed, softly hairy leaves, having crenate or crenate-serrulate edges. Flowers red or white, slightly hairy outside and borne in great profusion in May and June. The variety *nivea* has pure white flowers and is a remarkably handsome bush.

Culture &c. as above.

D. Lonicera (*D. canadensis*).—A N. American shrub 3–4 ft. high, with creeping roots, and short-stalked, ovate-pointed, serrate, smooth leaves, bright tinted in autumn. Flowers in summer, yellow.

Culture &c. as above.

D. middendorfiana.—A Siberian shrub with nearly sessile, ovate-lance-shaped, finely netted leaves, 2½–3½ in. long, sharply serrate on the margins and hairy on the nerves. Flowers in terminal panicles, yellowish-white, the lower petal dotted with pink.

Culture &c. as above.

D. rosea.—A Chinese shrub about 6 ft. high, with ovate lance-shaped, serrulate leaves. Flowers in spring, rose or white, numerous. There are many fine varieties, including *nana*, *nana aurea* (with young leaves golden-yellow), *Stelzneri*, *Lavallei*, *Looymanei* &c. It may be remarked that all the forms of *D. grandiflora*, *D. amabilis*, and *D. rosea* are now placed under one specific name, to wit, *D. florida*, according to the 'Kew Handlist.'

Culture &c. as above.

D. sessilifolia. —A handsome hardy shrub 3–5 ft. high, native of the mountains of N. Carolina. The ovate tapering acute leaves with serrate margins are about 3 in. long, and sit opposite each other on the stems without stalks. The yellow flowers, although individually little more than ½ in. across, are borne in great abundance in June on short-stalked cymes, and are decidedly attractive.

Culture &c. as above. Being a comparatively recent introduction, but little can be said as to the behaviour of this distinct yellow-flowered species. It seems however to be hardy in the milder parts of the kingdom, and will doubtless succeed under the same conditions as the other species. There is a form of it called *splendens.*

LIX. RUBIACEÆ—Woodruff Order

A large order with about 340 genera and over 4,000 species of erect, trailing, or climbing trees, shrubs, or herbs, very few of which are hardy. Leaves simple, opposite or whorled, entire, serrated, toothed, or pinnatifid-lobed. Stipules persistent or deciduous, free or adnate to the leaf stalk. Flowers usually hermaphrodite and regular. Calyx-tube adnate to the ovary; limb superior, somewhat cup-like or tubular, entire, toothed or lobed. Corolla gamopetalous, funnel-shaped, salver-shaped, bell-shaped, or rotate, smooth or hairy within. Stamens as many as the corolla lobes, rarely fewer, inserted in the tube. Fruit a capsule, berry, or drupe, 2–10 seeded.

The Bouvardia, Gardenia, Coffee and Cinchona belong to this order, but cannot be regarded as hardy plants in the British Islands.

CEPHALANTHUS.—A small genus of erect-growing shrubs or small trees with round or bluntly 4-angled stems. Leaves opposite or 3–4 in a whorl, shortly stalked, oblong or ovate lance-shaped, with short stipules between the stalks. Flowers in round compact heads. Calyx unequally 4–5-toothed, or 4-lobed. Corolla tubular or funnel-shaped, quite smooth, or hairy in the throat, and having 4 erect or spreading lobes. Stamens 4.

C. occidentalis.—A handsome deciduous shrub 5–6 ft. high, native of North America. The ovate tapering leaves are opposite or 8 in a whorl, and the whitish-yellow flowers appear about July in roundish heads at the ends of the shoots.

Culture and Propagation. — This little-known plant may be grown in the same soil and situation as the hardy Azaleas and Rhododendrons. It likes a moist sandy peat, but will also flourish in ordinary good garden soil, which although moist must also be well drained. The easiest way to increase the plant is by layering the ripened branches in autumn and detaching them the following spring or autumn when well rooted.

HOUSTONIA.—A genus with about 20 species of perennial herbs, having broad or narrow opposite leaves, and dimorphic flowers arranged in the axils of the leaves or in forked cymes. Calyx with 4 lobes, sometimes alternating with teeth, erect or recurved. Corolla funnel- or salver-shaped, 4-lobed. Stamens 4. Ovary 2-celled.

Culture and Propagation. — Most Houstonias flower nearly all the year round, and are excellent little plants for the rock garden. They like fine sandy and peaty soil with plenty of moisture, and are increased by division in early autumn, or by seeds in spring sown in cold frames or gentle heat about March, or in the open border about April and May. Chiefly natives of N.W. America.

H. cærulea (*Bluets*). — A charming little evergreen perennial 2–4 in. high. native of Virginia. Leaves ovate-lance-shaped, the lower ones spoon-shaped, slightly hairy, and forming low masses on the ground. Flowers from about May onwards, beautiful light blue, sometimes white as in the pretty variety *alba*. Corolla salver-shaped, ½ in. across.

Culture &c. as above.

H. longifolia.—A species about 6 in. high, with linear oblong upper leaves, and broadly ovate, entire, or twice or thrice toothed lower ones tapering at the base and ciliated. Flowers in August, pale lilac or lavender.

Culture &c. as above.

H. serpyllifolia. — A species about 3 in. high, with rather hairy spoon-shaped leaves, like those of Thyme. Flowers during summer, white.

Culture &c. as above.

ASPERULA (WOODRUFF).—A genus of about 50 species of pretty herbaceous plants with more or less 4-angled stems, and opposite leaves with one, two, or three leaf-like stipules on each side, making the whole look like a whorl of leaves. Flowers terminal and axillary in fascicles. Calyx-limb wanting. Corolla funnel- or bell-shaped, 4-lobed. Stamens 4 inserted on the tube or throat of the corolla.

Culture and Propagation. — The Woodruffs are pretty plants for the margins of shrubberies, narrow borders, or parts of the rockery, and thrive in any garden soil. They are readily increased by division of the roots in spring or summer after flowering. Seeds may also be sown as soon as ripe in prepared beds of good soil; or they may be sown in the open border in spring, and transplanted when large enough to handle easily, or merely thinned out if sown where the plants are to bloom.

A. cynanchica. — A smooth British perennial 9–12 in. high. Leaves 4 in a whorl, oblong lance-shaped. Flowers in summer, white or blue, elegantly marked with red lines; sometimes pure white.

Culture &c. as above.

A. longiflora. — A smooth weak-stemmed Hungarian species about 6 in. high. Leaves 4 in a whorl, linear-obovate. Flowers in summer, whitish, tinged with yellow inside, red outside.

Culture &c. as above.

A. montana. — A Hungarian species 6–8 in. high. Leaves linear, lower ones 6 in a whorl, passing to 4 and 2 upwards. Flowers in June and July, pink.

Culture &c. as above.

A. odorata (*Sweet Woodruff*). — A charming British plant 6–12 in. high, with square stems, and lanceolate, minutely toothed leaves 8 in a whorl. Flowers in May and June, pure white, numerous. When dried the plant has a delicious hay-like scent. It imparts an agreeable perfume to clothes and preserves them from insects.

Culture &c. as above.

A. orientalis (*A. azurea setosa*). — A beautiful Caucasian annual about 1 ft. high, with lance-shaped, bristly leaves, about 8 in a whorl. Flowers profusely in summer, sky-blue in colour, very fragrant.

Culture &c. as above.

CRUCIANELLA (*Crosswort*).—A genus containing about 26 species of annual or perennial hairy herbs, with 4 or more linear lance-shaped leaves in a whorl. Flowers in spikes or fascicles; corolla funnel-shaped, with a long slender tube.

C. stylosa.—A pretty dwarf procumbent plant, 9-12 in. high, native of the Caucasus and Persia. Leaves 8-9 in a whorl. Flowers in summer, pale rose, small, freely produced in dense terminal heads, style much protruding beyond the mouth of the corolla. There is a scarlet-flowered form called *coccinea* and also one called *purpurea* with purple blossoms.

Culture and Propagation.—This plant is suitable for borders, bare banks, or rockeries, in sandy or chalky soil. It makes large masses or tufts and requires to be either divided or cut back to be kept within bounds. It is easily increased by division in early autumn or spring, and by means of seed sown in cold frames as soon as ripe, or in the open border about April; or in gentle heat about March.

MITCHELLA.—A genus with a few species of smooth or downy creeping herbs, with opposite, shortly-stalked, ovate rounded leaves, and white fragrant flowers. Calyx tube ovoid; limb 3-6-toothed. Corolla funnel-shaped, bearded in the throat; limb 3-6-lobed, recurved, valvate. Fruit scarlet.

M. repens.—A pretty little North American plant with small reddish leaves often marked with whitish lines. Flowers in summer, white, tinged with purple, fragrant, usually two on each stem.

Culture and Propagation.—A useful plant for rockwork in ordinary soil. It may be increased by division in early autumn or spring; or seeds may be sown in cold frames when ripe, or in gentle heat in March, afterwards transferring the seedlings to the open about the end of May.

NERTERA.—A small genus of slender smooth or slightly hairy creeping herbs with small, opposite, sessile or stalked, more or less ovate lance-shaped leaves. Flowers inconspicuous, sessile axillary, hermaphrodite, or one-sexed by abortion. Calyx tube ovoid 4-5-toothed. Corolla tubular or funnel-shaped with a smooth throat, and 4 sub-erect lobes. Stamens 4, protruding. Ovary 2-celled; style 2-branched. Fruit a fleshy red ovoid or globose 2-stoned drupe.

N. depressa (*Bead Plant*).—A charming New Zealand plant forming dense tufts or masses of small ovate rather fleshy bright green leaves. Flowers minute, greenish or pinkish, succeeded by great numbers of juicy bright orange-red roundish berries about half the size of Peas.

Culture and Propagation.—This interesting little plant has been called the Flowering or Fruiting Duckweed, but it has no affinity at all with the true Duckweed, which is nearer the Arrowheads (p. 806) and Flowering Rushes (p. 806). It prefers light sandy loam and a little leaf mould, and makes a bright show in the rock garden if it can be grown in a cool place facing north. It must have plenty of light without strong sunshine, and also an abundance of water during the summer months. Grown in shallow pots or pans under similar conditions in cold frames, the plants may be used in a variety of ways, and are very effective in cold greenhouses. They may be increased by dividing the tufts in early spring and placing the pieces in small pots in light soil plunged in a little heat until established. Afterwards they should be removed to cooler quarters and hardened off as much as possible. Seeds may also be sown as soon as ripe in a cool damp shaded frame, afterwards pricking the tiny seedlings out into pans of finely sifted soil.

LX. VALERIANEÆ—Valerian Order

An order comprising 9 genera and about 300 species of annual or perennial herbs, or undershrubs, with opposite entire or pinnatifid leaves and small flowers in forked cymes. Flowers hermaphrodite or sometimes diœcious by abortion. Calyx superior, limb lobed or feathery. Corolla funnel-shaped, tube often spurred at the base; lobes 3-5, unequal. Stamens 1-5, often protruding. Fruit dry, indehiscent.

VALERIANA.—A genus of perennial herbs or undershrubs, the lower leaves of which are entire or toothed, the upper ones pinnately divided, or twice or thrice pinnately cut. Flowers white or pink, in cymes, spikes or loose corymbs or panicles. Calyx cut into 5–15 hair-like divisions. Corolla 5-lobed, slightly gibbous at the base. Stamens 3, rarely 1–2 by abortion.

Culture and Propagation.—Although there are about 150 species of Valerian comparatively few are of any garden value. They all flourish in ordinary good and well-drained garden soil, but prefer somewhat chalky surroundings. They are useful for the rougher parts of the garden, and may be planted on old ruins, rockeries, banks &c. in the same way as the species of Centranthus mentioned below. Propagation is effected easily by seeds sown as soon as ripe in cold frames; in gentle heat in March; and in the open border in April and May. In the two first cases the seedlings may be transplanted about the end of May. Very often seedlings from self-sown seeds spring up spontaneously, and thus reproduce the plant naturally. Division of the roots may also be adopted to increase the plants in early autumn or in spring.

V. montana.—An elegant perennial 4 6 in. high, native of the Alps. It forms bold masses in the rockery or border, and has entire leaves, the lower ones being oblong spoon-shaped, the upper ones lance-shaped. The beautiful soft rosy pink flowers appear from April to June, and are borne in regular corymbs.

Culture &c. as above.

V. officinalis (*Cat's Valerian; All Heal*).—This perennial is a native of the British Islands, and is found wild near the banks of streams, and in damp pastures. It grows about 3 ft. high, and the glaucous leaves are all pinnately cut into entire or serrate lobes. Flowers from June to August, pale pink or white, in 3-forked corymbs.

Culture &c. as above. Although not so handsome as other Valerians, this species is useful for damp shady parts of the garden. It emits a peculiar odour which has a decided attraction for cats. These garden pests roll over and over the plants and enjoy themselves but spoil the plants. The Cat Valerian therefore should not be planted near choicer perennials, as the latter are sure to suffer from the attention of the cats.

V. Phu.—A rather strong-smelling Caucasian Valerian with fistular stems 2–4 ft. high and glaucous leaves, the lower ones of which are oval, oblong, entire or toothed, the upper ones being pinnately cut. Flowers white, from June to August. The variegated form with golden leaves in spring is very pretty.

Culture &c. as above. This species is also a favourite with cats.

Other Valerians sometimes met with are *V. pyrenaica* from the Pyrenees. It is a rather coarse-growing perennial 2–4 ft. high, and has large heart-shaped deeply toothed leaves often 1 ft. across, and pale pink flowers like those of the Cat Valerian in July and August; and *V. angustifolia*, a glaucous alpine plant about 1½–2 ft. high with linear lance-shaped leaves, all entire and nearly perfoliate. Flowers from May to July, bright rose, but occasionally white. They require similar treatment to the other Valerians.

CENTRANTHUS (*Spur Valerian*). A genus of 10 species of ornamental herbaceous annuals or perennials with entire or pinnate leaves. Flowers in corymbose or panicled cymes at the ends of the shoots. Calyx-limb feathery. Corolla tube slender, flattened lengthways, divided and spurred at the base. Stamens usually 1. Fruit membranous.

Culture and Propagation. — These plants grow well in ordinary garden soil, and are very handsome in the flower border, on old walls, or rockeries. The perennial kinds may be increased by dividing the roots in early autumn or in spring; by cuttings of the young growths or side shoots in spring or autumn under handlights; or by seeds sown as soon as ripe in cold frames, afterwards pricking the seedlings off, and growing under glass until about the end of May following when they may be transferred to the open air. Seeds may also be sown in gentle heat in March, or in the open border in April and May, but the best plants as a rule are from seeds sown in autumn. The seed of annuals should be sown about March in gentle heat so as to have the plants ready for the border at the end of May.

C. macrosiphon.—A showy, compact-growing Spanish annual 1½–2 ft. high, with fleshy stems and smooth, shining, broadly oval and coarsely toothed glaucous leaves, the lower ones stalked and jagged-edged, upper ones sessile.

Flowers in July, rosy-carmine, larger and brighter than those of *C. ruber.* There is a white-flowered variety, and also a strain called *nana* remarkable for its dwarf compact habit. It forms dense tufts, about 9–12 in. high, the plants being literally covered with blossom.

Culture &c. as above.

C. ruber (*Red Valerian; Pretty Betsy*). — A beautiful and well-known perennial 2–3 ft. high, native of Europe, N. Africa, W. Asia, and naturalised in the British Islands. Leaves ovate or lance-shaped, 2–4 in. long, the lower ones stalked, upper sessile, sometimes toothed at the base. Flowers from June to September, red or white, in dense corymbose panicles. Spur slender.

Culture &c. as above.

FEDIA.—A genus closely allied to the preceding containing only the one species here described:—

F. Cornucopiæ. — A pretty glaucous annual native of S. Europe and N. Africa, with purplish stems about 6 in. high, and ovate-oblong toothed leaves; lower ones stalked, upper sessile. Flowers in July, red, lilac-rose, or carmine, in corymbose fascicles with hollow stalks. Calyx 2–4-toothed. Corolla 2-lipped with an elongated tube; upper lip 2-lobed, lower one 3-lobed.

Culture and Propagation. — This species is easily grown in ordinary soil and may be used as a bordering or in the lower parts of the rockery. Being an annual it may be readily raised from seeds sown in the open border in April, afterwards thinning the seedlings out.

LXI. DIPSACEÆ—Teasel Order

An order containing 5 genera and about 125 species of biennial or perennial herbs, with opposite rarely verticillate, entire, toothed, or lobed leaves, no stipules, and flowers in heads surrounded by an involucre. Calyx-limb superior, cup-shaped, entire, lobed or ciliated with five or more rigid bristles. Corolla funnel-shaped or cylindric, often curved; lobes 4-5, blunt. Stamens 2 or 4, inserted on the corolla tube, often protruding. Fruit indehiscent, covered by the hardened involucel.

MORINA. — A genus containing about 8 species of smooth or softly downy, perennial, Thistle-like herbs, with oblong, sinuate, spiny-toothed, rarely entire leaves, and flowers crowded in whorls in the axils of the bracts or floral leaves. Corolla long, tubular, gaping. Stamens 4 (2 long, 2 short).

Culture and Propagation.—Morinas thrive in rich sandy loam, and require a little shade and shelter. The roots may be divided to increase the plants as soon as flowering is completely over, and new roots will thus have a chance to develop before the winter frosts set in.

Unless division is performed in early autumn it will be safer to defer the operation until spring. Seeds may be sown also when ripe in rich sandy loam in a cold frame. When the young plants are large enough to handle they may be pricked out into pots, and it is often safer to grow them on thus until the second year, before transferring to the open ground. They are effective plants in the border or rockery, and are perfectly hardy in the milder parts of the country. In the northern parts, however, they may require the protection of a little dry litter in severe winters.

M. betonicoides. — A beautiful herbaceous perennial 12–18 in. high, native of the Sikkim Himalayas. It has linear lance-shaped Thistle-like leaves with spiny teeth or hairs on the margins, and during the summer months bears heads of bright rosy-purple flowers with a crimson spot at the base of the three lower lobes of the curved funnel-shaped corolla.

Culture &c. as above.

M. coulteriana.—A pretty species 6 18 in. high, native of the Western Himalayas, with narrow, spiny-edged leaves. Flowers in summer, pale yellow, in terminal heads, bracts united into a broad cup, with rigid spines.

Culture &c. as above.

M. longifolia.—A distinct and handsome Himalayan perennial about 2 ft. high or more. Leaves Thistle-like, about 1 ft long, less than 2 in. wide, pinnatifid, with wavy and rather spiny-toothed margins.

Flowers from June to September, white in bud, changing to delicate pink and crimson, in crowded whorls in the axils of the upper leaves or spiny bracts.

Culture &c. as above.

DIPSACUS (TEASEL).—A genus of erect hairy or prickly biennial herbs, with opposite leaves, usually connate at the base, and toothed or jagged at the margins. Flower heads terminal, oblong-ovoid or roundish. Calyx limb superior, cup-shaped, entire lobed, or ciliate. Corolla funnel-shaped or cylindrical, often curved; lobes 4–5, obtuse. Stamens 4.

Culture and Propagation. — The Teasels are best suited for wild parts of the garden, old banks, hedgerows &c. in any soil. Seeds may be sown in such places when ripe, or in spring, and the plants left to look after themselves. They are picturesque in appearance owing chiefly to their large, more or less conical and pitted flower heads, but are hardly choice enough for the herbaceous border.

D. Fullonum (*Fuller's Teasel*). — A prickly-stemmed plant 4–6 ft. high, with oblong lance-shaped, serrate leaves united at the base. Flowers in summer, whitish, with pale purple anthers, in ovoid heads; bracts spreading.

Culture &c. as above.

D. laciniatus. — A bold, prickly-stemmed plant 8–10 ft. high, native of Europe and N. Asia. Leaves united at the base into a cup which holds water when it rains, in the same way as the leaves of the Cup Plant (*Silphium perfoliatum*), sinuately jagged, lobes sinuately toothed, downy beneath. Flowers in July, whitish, with red anthers in ovoid heads. Bracts of involucre slightly erect, stiffish.

Culture &c. as above.

D. sylvestris (*Common Teasel*).—A British and European plant 6 ft. high, with prickly stems and ovate lance-shaped, pointed toothed leaves, united at the base. Flowers in July, pale lilac, in ovoid-oblong heads. Bracts of involucre weak; inflexed.

Culture &c. as above.

CEPHALARIA.—A genus of annual or perennial herbs, closely allied to *Dipsacus*. Leaves toothed or pinnatifid. Flower heads terminal, globose.

Culture and Propagation. — These plants are scarcely suitable for the flower garden proper, but are appropriate in wild spots and will flourish in any soil. They may be easily increased by division in early autumn or spring; or seeds may be sown as soon as ripe, afterwards transplanting the seedlings to flower the following season.

C. alpina.—A tall-growing perennial native of the Alps, with furrowed stems 6–8 ft. high. Leaves opposite, downy, grey-green, the lower ones oblong entire, the upper ones pinnately cut into lance-shaped lobes. The heads of pale yellow flowers appear in June and July.

Culture &c. as above.

C. tatarica. — A coarse-growing Siberian perennial 5–6 ft. high, with striped hairy stems, pinnate leaves, and decurrent oval lance-shaped, serrated leaflets. Flowers in summer, yellow, in large heads, paleæ or scales deep green, white inside, ciliated.

Culture &c. as above.

SCABIOSA (SCABIOUS; PINCUSHION FLOWER).—A genus containing not more than 80 distinct species of annual or perennial herbs, sometimes rather shrubby at the base, with entire, toothed, lobed or dissected leaves. Bracts of the involucre in one or two series. Receptacle more or less conical, hairy, or with scaly bracteoles shorter than the florets. Calyx limb cup-shaped, with 4 or more bristly teeth. Corolla limb 4–5-cleft, nearly equal, or often oblique, or two-lipped. Stamens 4, very rarely 2.

Culture and Propagation.—Scabious grow well in ordinary good garden soil, and are easily raised from seed sown either in spring or autumn, according as to whether they are required to bloom in summer or spring. The perennial kinds may be increased by division in early autumn or spring, and may also be increased by seeds sown as soon as ripe in the open border, afterwards transplanting the seedlings in mild showery weather when large enough to handle easily.

The following is a selection of the kinds best for the flower garden:—

S. atropurpurea (*Mournful Widow; Common Purple* or *Sweet Scabious*).—A very handsome annual, native of S.W. Europe, 2–3 ft. high. Lower leaves lance-shaped ovate, lyrate, coarsely toothed; upper ones pinnately cut into oblong, toothed or cut lobes. Flowers in July

and August, in deep crimson heads, very fragrant. There are several very fine varieties with all shades of crimson, purple, yellow, and white, that called *grandiflora* being particularly handsome. There is a variety with distinct yellow leaves (*foliis aureis*), and a dwarf-strain about 1 ft. high, called *nana*, which has also much variation in the colour of the flowers.

Culture &c. as above. Seeds of this species may be sown in the open border from the end of April to the end of September, to obtain a good succession of flowering plants. The seeds sown in the earlier period of the year will produce flowering plants in autumn, but it is better to thin the seedlings out for this purpose rather than transplant them. The thinnings, however, may be transferred to another part of the garden and will flower the following season. The seedlings from the later sowings should be pricked out before the end of October so that they may get established before the severe weather sets in.

The purple-crimson flowered *S. maritima* and the white-flowered *S. Metaxasi* (or *S. palæstina*) may be treated in the same way as *S. atropurpurea*, but they are not so well known.

S. caucasica.—A handsome perennial or biennial, 1–3 ft. high, native of the Caucasus. Lower leaves lance-shaped, pointed, glaucous, entire. Flowers in summer, pale blue, in a large head about 3 in. across. Corolla 5-cleft. Involucre very hairy. The variety *elegans* has whitish leaves; *alba* has creamy-white heads of flowers; and *heterophylla* has hairy pinnatisect leaves, and large pale purple heads of flowers.

Culture &c. as above. Although this species is a true perennial and may be increased by division of the roots in early autumn or spring, it is on the whole best grown as a biennial. If the seeds are sown about July or August the seedlings may be transplanted in mild showery weather by the end of September, and will produce fine dense masses for flowering the following year. As the flower stalks are very long this is an excellent plant for cutting.

S. correvoniana.—A handsome bushy Scabious, native of the Trans-Caucasus. It grows 6–9 in. high, and bears large heads of pale yellow flowers from May to August.

Culture &c. as above. Easily increased by seeds or division.

S. graminifolia. — A graceful plant 1½–2 ft. high, native of S. Europe. Leaves linear lance-shaped, entire, silvery-white. Flowers from June to October, pale blue or rosy, in heads like those of *S. caucasica.*

Culture &c. as above for *S. caucasica.*

S. Pterocephala. — An ornamental tufted perennial 4–6 in. high, native of Greece, with simple elliptic, lyrate, or pinnately divided, crenate-toothed leaves. Flowers in summer, purple, in heads about 1½ in. across, on stout stalks 2–3 in. high.

Culture &c. as above for *S. caucasica.*

S. webbiana. — A soft silky-haired plant, 6–10 in. high, native of Phrygia. Lower leaves stalked, obovate, crenate; upper ones pinnatifid with ovate or oblong entire lobes. Flowers in July, creamy-yellow, on long stalks.

Culture &c. as above.

LXII. COMPOSITÆ—Daisy Order

This is the largest order of herbs, shrubs, or trees in the vegetable kingdom, comprising between 700 and 800 genera, and about 10,000 species, comparatively few of which are of any garden value. Leaves alternate, whorled, or less frequently opposite, simple or compound, without stipules. Flowers sessile on the expanded stalk or receptacle, and surrounded by a number of more or less leafy bracts forming an involucre. Calyx superior; limb none, or feathery, or scaly, and technically known as a 'pappus.' Corolla variable in different tribes of the order. Stamens 4 or 5, anthers usually united (syngenesious), forming a tube through which the style passes.

SUB-ORDER. TUBULIFLORÆ

The flower-heads either consist of entirely hermaphrodite tubular florets with a regular 5-toothed corolla, or the central (disc) florets are tubular and hermaphrodite, while the outer (ray) florets are strap-shaped (ligulate) and female or sterile.

Tribe I. VERNONIEÆ.—Herbs, shrubs, or rarely trees. Leaves usually alternate, entire, toothed, or very rarely lyrately cut. Flowers purplish, violet, or white, very rarely blue, never yellow. Florets all tubular and hermaphrodite. Branches of the style covered with bristles.

VERNONIA (*Ironweed*).—A large genus of more or less downy herbs or shrubs, usually with alternate, entire or toothed, feather-veined, stalked or sessile leaves. Flower-heads at the ends of the branches, either solitary or in cymose panicles, and usually purple, reddish or blue, rarely white.

Culture and Propagation.—Although there are nearly 400 species of Vernonia, only those mentioned below are of any garden value; and even these are more suitable for semi-wild situations where they have a picturesque effect. They flourish in ordinary garden soil, but the flowers, unfortunately, are often nipped by the early frosts in September and October. The easiest way to increase the plants is by dividing the roots in spring as growth is commencing. If this operation is performed in autumn it is likely to interfere with the production of flowers. Seeds may also be sown in cold frames or in gentle heat in spring, afterwards transplanting the seedlings in showery weather when large enough for the open ground.

V. novæboracensis.—A stately North American herbaceous perennial with ribbed purplish downy stems 6–8 ft. high. The shortly stalked, narrowly lance-shaped leaves are 3–4 in. long, rough and dark green above, paler beneath, and with finely toothed margins. The violet-purple flower-heads, each ½–¾ in. across, appear in September and October, and are borne in large corymbose panicles.

Culture &c. as above.

V. præalta.—This is also a native of North America and is very similar to *V. novæboracensis* in appearance. It is, however, much shorter, being only 3–5 ft. high, and having smooth instead of downy stems. The leaves are also smooth and narrower, but the purple flowers are borne in larger heads and appear somewhat earlier, in August and September.

Culture &c. as above.

STOKESIA (STOKES'S ASTER).—A genus containing only one species:—

S. cyanea.—A handsome vigorous N. American perennial 1½–2 ft. high, with alternate, smooth, lance-shaped, entire leaves, or somewhat spiny-ciliated at the base; lower ones stalked; upper stem-clasping. Flowers in August and September, blue, in heads about 1 in. across. Involucre roundish, the outer florets narrowly 5-cleft, scales prolonged into a leafy bristly fringed appendage.

Culture and Propagation.—This species grows freely in warm good sandy soil and leaf mould and is effective in the border. It may also be grown in pots for the conservatory. It is increased by division in spring, the slips being inserted in sharp sandy soil in a warm border. When well rooted they may be transplanted to flowering positions. Seeds may also be sown in spring under glass or as soon as ripe in autumn in cold frames. The seedlings are pricked out into light soil when large enough, and are afterwards transferred to the open border.

Tribe II. EUPATORIEÆ.—Herbs or shrubs, rarely trees. Leaves usually opposite, or the upper ones, or all, alternate, rarely in whorls, entire, toothed, or rarely dissected. Flowers rosy, purplish, bluish, or white, rarely yellowish-white or pale yellow, but never true yellow. Florets all tubular and hermaphrodite. Branches of styles usually club-shaped or enlarged at the tips.

AGERATUM (FLOSS FLOWER).—This genus consists of annual or biennial herbs with opposite leaves and blue or white flowers. Involucre of many imbricated linear bracts. Receptacle naked. Pappus composed of several curved scales, broad at the base.

Culture and Propagation. — Ageratums like a light rich soil, and are among some of the most showy plants used for beds and borders during the summer. The dwarfer sorts make excellent edgings, or they may be planted to form a carpet between taller-growing Zonal Pelargoniums. They seed freely, and a small quantity saved every year will be sufficient to raise hundreds of plants in spring. The seed must be sown about February or March in slight bottom heat. When large enough the seedlings may be pricked out into shallow boxes, or separately into small pots to make sturdy plants by the end of May. During the summer they may also be increased by cuttings, and if seeds are prevented from ripening, the plants become more or less perennial. But they are scarcely worth this trouble, as they must be wintered in greenhouses until the following May, and this is an important point where space under glass is limited, and required for more important plants.

Ordinary light sandy garden soil will suit the plants well, and by pinching out the tips of the young shoots numerous side branches will be developed and increase the number of feathery flower-heads.

A. Lasseauxi. — A native of Monte Video, 1½-2 ft. high, with lanceolate elliptic leaves, and heads of rose-coloured flowers in summer.

Culture &c. as above.

A. mexicanum. — This is the best known species, and its varieties are largely grown for bedding purposes every year. It is a native of Mexico, and grows naturally about 2 ft. high, with ovate, coarsely toothed leaves, and a profusion of lilac-blue, fluffy flowers in summer and autumn. There are several dwarf, free-flowering varieties, among which the following are the best: *Cupid*, rich blue; *Countess of Stair*, pale blue; *Queen*, silvery grey; *Snowflake*, white; *Swanley blue*, very deep blue; *Mauve Beauty*, rich mauve; and others more or less desirable.

Another Mexican species is *A. Wendlandi* which grows 4-8 in. high, and forms dense masses of grey-green downy leaves, above which appear large greyish-blue flower-heads. There is also a white-flowered variety which is quite as free-growing as the type.

Culture &c. as above.

EUPATORIUM.—A genus containing upwards of 400 species, very few of which are of garden value. Leaves opposite, rarely alternate, entire, toothed, or rarely dissected. Flower-heads purplish, bluish, or white, in terminal corymbs. Receptacle naked. Pappus rough. Bracts of the involucre imbricate in 2-3 rows.

Culture and Propagation. — The Eupatoriums are coarse-growing plants more suitable for rough parts of the garden than the flower border. They grow in any soil, and may be increased by division of the roots in autumn or in spring. Seeds may also be sown in bottom heat about March, and the young plants when large enough may be pricked out into shallow boxes or pots, and grown on until about the end of May, when they may be transferred to the open ground. Seeds may also be sown in cold frames as soon as ripe, but the seedlings cannot be planted out with safety until the following spring.

E. ageratoides.—A native of North America 1-4 ft. high, with ovate, rather heart-shaped, stalked and coarsely toothed leaves. Flowers in summer, pure white, numerous, in compound corymbs.

Culture &c. as above.

E. aromaticum.—A sturdy N. American species 3-4 ft. high. Leaves usually shortly stalked, rounded, toothed. Flowers late in summer, white, in loose corymbs.

Culture &c. as above.

E. cannabinum (*Hemp Agrimony*).—A handsome native perennial, with downy stems 2-4 ft. high. Leaves with 3-5 lance-shaped, serrate leaflets. Flowers in July, reddish-purple, in terminal tufts.

Culture &c. as above.

E. glechonophyllum.—A tufted Chilian species 1½-2 ft. high with oval acute, coarsely toothed leaves. Flower-heads pure white borne in corymbose clusters during the summer months.

Culture &c. as above. This species is best treated as an annual like the Ageratums, and may be raised from seeds sown in gentle heat in spring, or in autumn in cold frames. In both cases the seedlings can be placed in the open border at the end of May.

E. purpureum (*Trumpet Weed*).—A N. American species 3-9 ft. high or more. Leaves 3-6 in a whorl, somewhat ovate or lance-shaped, pointed, roughish, unequally toothed, downy beneath. Flowers in autumn, purplish, in corymbs. Grown in rich soil and in bold masses, this species has a very bold effect in the garden.

Culture &c. as above.

LIATRIS (Snakeroot).—This genus contains about 16 species of perennial herbs, all natives of N. America. Leaves alternate or scattered, narrow, entire, 1-5-nerved. Flower-heads purplish or white, spicate, racemose, or panicled. Bracts of the involucre small, imbricated, in many rows. Receptacles naked. Pappus feathery.

Culture and Propagation.—When grown in masses these plants are very effective in the flower border with their long dense spikes of flowers. It may be remarked that the flower-heads of these plants usually open from the top of the spikes downwards, and not from the bottom upwards as found in most other plants. They thrive in ordinary garden soil, and may be readily increased by division of the roots in spring; or by seeds sown as soon as ripe in the autumn in cold frames, afterwards pricking out the seedlings and growing on until about the end of May, when they may be planted out.

L. elegans.—An elegant plant 2-4 ft. high, with smooth, spotted leaves; lower ones spoon-shaped, 3-5-nerved; upper ones strap-shaped, short, sometimes spiny-tipped. Flowers in summer and autumn, purplish, in spikes a foot or more long.

Culture &c. as above. Easily increased by division in spring.

L. graminifolia.—A tuberous-rooted species with pointed, remotely dotted leaves, fringed at the base. Flowers in autumn, purple, loosely spicate, in the axils of the upper leaves or bracts.

The variety *dubia* (*L. propinqua*) has upright spikes of rather large heads of flowers, with the bracts of the involucre narrower and thinner than in the type. The variety *pilosa* has very narrow involucre bracts.

Culture &c. as above.

L. odoratissima (*Trilisa odoratissima*). *Vanilla Plant.*—A pretty plant 2-4 ft. high. Leaves thick, emitting a fragrant Vanilla-like odour when bruised; lower ones large, obovate spoon-shaped, tapering at the base, often slightly and bluntly toothed; upper ones oblong, stem-clasping, becoming smaller and scattered higher up. Flowers in September, bright purple, numerous; bracts of the involucre glandular.

Culture &c. as above.

L. pycnostachya.—A pretty species with stout, leafy stems 3-5 ft. high, and rigid sessile leaves; lower ones narrow lance-shaped, blunt, 5-7-nerved; upper ones short, crowded, narrow. Flowers in summer and autumn, pale purple, in dense cylindrical spikes 1-1½ ft. long.

Culture &c. as above. This is best treated as a biennial. It grows well on dry soils, and the seeds may be sown in cold frames in autumn, and the seedlings transferred to the open ground in mild showery weather about the end of April or May.

L. scariosa.—A plant about 2 ft. high with very long and narrow leaves, and purple flower-heads about 2 in. across, in September.

Culture &c. as above. Easily increased by division in spring.

L. spicata.—A handsome perennial 1-3 ft. high, with lance-shaped acute leaves, ciliated at the base. Flowers in September, purple, in spikes 6-15 in. long. Bracts of involucre oblong or oval.

Culture &c. as above. Easily increased by division of the roots in spring.

L. squarrosa.—A showy species 2-3 ft. high. Lower leaves long, ½ in. wide, 3-5-nerved; upper ones strap-shaped, stiffish. Flowers in summer and autumn, bright purple, on leafy and downy stems. Bracts of involucre with elongated leafy tips.

Culture &c. as above.

Tribe III. Asteroideæ.—Leaves usually alternate, very rarely opposite, entire, lobed, or rarely dissected. Outer (ray) florets often strap-shaped, females sterile; inner (disc) florets hermaphrodite. Branches of the style hairy above.

XANTHOCEPHALUM.—A small genus of herbs or shrubs with alternate narrow entire or toothed leaves and yellow flower-heads borne either singly or in loose clusters at the ends of the shoots. Involucre hemispherical or broadly bell-shaped. Receptacle flat, pitted. Ray florets strap-shaped spreading, 5-cleft at the apex.

X. gymnospermoides.—A vigorous downy annual 3-4 ft. high, native of Arizona, with lance-shaped sharply toothed leaves tapering into a longish stalk. The bright yellow flower-heads, each about ¾ in. across, appear late in summer in an inverted pyramidal cluster a foot or more in diameter.

Culture and Propagation.—This little-known plant flourishes in ordinary good garden soil in warm sunny positions, and owing to its late-flowering propensities is well worth a place in the flower border. It may be raised from seeds sown in gentle heat in spring and planted out in May, see p. 78.

GRINDELIA.—A genus with about 20 species of biennial or perennial shrubs or herbs, with alternate, sessile or half stem-clasping leaves, often rigid, toothed, or serrately fringed. Flowers in solitary heads at the ends of the branches. Pappus composed of 28 narrow deciduous bristles.

Culture and Propagation.—Grindelias grow readily in a mixture of peat and loam. Seeds may be sown in slight heat about March, and the seedlings planted out in June. The plants may also be increased by cuttings in a cool frame, but they require the protection of a cool frame or greenhouse in winter, except perhaps on the south coast in the mildest parts and in sheltered spots. For the cultivation of biennials in general see p. 60, as most of the Grindelias may be treated as such.

G. glutinosa.—A pretty Peruvian shrubby plant about 2 ft. high, with evergreen, ovate-oblong, serrated leaves. Flowers for the greater portion of the year, yellow, 1-2 in. across, with clammy involucres.

Culture &c. as above.

G. grandiflora.—A biennial 2½-3 ft. high, native of Texas. Lower leaves spoon-shaped; upper ones sessile, clasping, toothed. Flowers during summer, deep yellow or orange, about 1½ in. across, clammy before opening.

Culture &c. as above.

G. inuloides.—A shrubby Mexican biennial, about 1½ ft. high. Leaves sessile, oblong lance-shaped acute, serrated towards the apex. Flowers from July to September, yellow.

Culture &c. as above.

G. squarrosa (*Donia squarrosa*).—A N. American perennial, about 2 ft. high, with oblong, clasping, sharply toothed leaves. Flowers from July to September, yellow.

Culture &c. as above.

XANTHISMA.—A genus having but one species:—

X. texana (*Centauridium Drummondi*).—A smooth erect annual or biennial 1½-2 ft. high, native of Texas, having alternate linear lance-shaped entire leaves. The bright yellow flower-heads about 1½ in. across are borne singly during the summer months at the tips of the numerous shoots.

Culture and Propagation.—This plant is suitable for the flower border with other composite annuals, and will flourish in ordinary garden soil. Seeds should be sown in gentle heat in February and March, so as to have strong seedlings for planting out 1-1½ ft. apart in bold masses at the end of May.

SOLIDAGO (GOLDEN ROD).—A genus of about 80 species of tall-growing, rather coarse, perennial herbs, with alternate, entire or toothed leaves, and terminal racemes or clusters of small yellow flowers. Involucre oblong or narrow bell-shaped, with bracts in many series. Ray florets strap-shaped, spreading, rarely small and erect. Receptacles naked. Pappus in one series of rough, rigid bristles.

Culture and Propagation.—The Golden Rods are coarse growers and rank feeders, and soon impoverish a rich soil. In rough places or old shrubberies they do very well, and brighten the surroundings with their golden-yellow trusses. They may be increased by division in autumn or early spring. A good top dressing of manure every autumn and winter will enable the plants to grow for several years in the same place. Nearly all are natives of North America. The following are a few of the best for the garden, but several others are to be met with in botanical collections. The flowers of all the species are yellow, and although insignificant individually, are nevertheless showy on account of their great numbers.

S. canadensis.—A species with roughly hairy stems, 3–6 ft. high, and lance-shaped, pointed, sharply serrate, or entire leaves, more or less downy beneath. Flowers in August.

Culture &c. as above.

S. Drummondi.—Grows 1–3 ft. high, with broadly ovate or oval leaves, coarsely and sharply toothed, or almost entire, velvety downy beneath. Flowers in summer; ray florets 4 or 5.

Culture &c. as above.

S. lanceolata (*Euthamia graminifolia*).—A downy plant 2–3 ft. high, with linear lance-shaped, entire leaves, and obconical heads of flowers in dense clusters, produced in September; ray florets 15–20.

Culture &c. as above.

S. rigida.—A vigorous species 3–5 ft. high, with oval or oblong, thick, rigid leaves. Flowers in September, in compound corymbs; ray florets 7–10.

Culture &c. as above.

S. rugosa (*S. altissima*).—A roughly hairy plant, 2–7 ft. high. Leaves ovate-lance-shaped, elliptic or oblong, often thickish and very wrinkled, coarsely and sharply toothed. Flowers in August and September, in spreading, panicled racemes. Ray florets 6–9.

Culture &c. as above.

S. sempervirens. — A thick, smooth-stemmed plant 1–6 ft. high, with smooth, entire, lance-shaped leaves. Flowers in September, in short racemes. Ray florets 8–10.

Culture &c. as above.

S. serotina (*S. fragrans*).—A more or less glaucous-stemmed plant, about 3 ft. high. Leaves lance-shaped, pointed, serrated, roughish above, smoothish beneath. Flowers from August to October, in pyramidal panicles.

Culture &c. as above.

S. speciosa.—A handsome plant, with stout, smooth stems 3–6 ft. high. Leaves more or less oval, thickish, rough, slightly serrate; lower ones 4–6 in. long. Flowers in October, somewhat crowded in pyramidal clusters.

Culture &c. as above.

S. Virgaurea. — A native of British Islands, as well as the N. temperate zone, 6–24 in. high, with linear or lance-shaped oblong, obscurely toothed leaves, 1–4 in. long. Flowers from July to September, crowded. Ray florets 10–12, spreading. *Cambrica* is a dwarf variety.

Culture &c. as above.

APHANOSTEPHUS. — A small genus of many-stemmed downy herbs with alternate leaves and solitary flower-heads at the ends of the shoots. Involucre hemispherical. Receptacle convex or somewhat conical. Ray florets white or purple; disc yellow.

A. ramosissimus. — A pretty annual about 4 in. high, native of Texas. It makes dense tufts and produces during the summer months numerous stems each bearing a flower-head about 1 in. across with violet-blue or purple ray florets surrounding a yellow disc.

Culture and Propagation. — This flourishes in ordinary garden soil in warm sunny spots in the rock garden or flower border. It should be raised from seeds sown annually in February or March in gentle heat, so that the seedlings will be large and sturdy for the open air by the end of May.

BRACHYCOME.—A genus of pretty annuals or perennials, closely related to the Daisy (*Bellis*) in structure. Bracts of the involucre with membranous margins. Receptacle pitted, naked. Fruit flattened, surmounted with a bristly pappus.

B. iberidifolia (*Swan River Daisy*). A pretty Australian annual 8–12 in. high, with pinnate leaves cut into linear segments. Flowers during summer and autumn, bright blue (or white in the variety *alba*), about 1 in. across, with a dark or pale centre, in loose terminal clusters. There is also a form with rosy-lilac blossoms, and one called *bicolor* in which the blue flowers have a distinct and well-defined white band at the base of the petals.

Culture and Propagation.—If grown in a bright sunny spot the Swan River Daisy flowers profusely. Seeds may be sown in gentle heat in March, and the seedlings pricked out or potted on until the first week of June, when they can be planted out; or they may be sown in the open border at the end of April, thinning the seedlings out to about 6 in. apart. Seeds are often sown in a cool frame in September, and the plants grown on in pots in a cool greenhouse during the winter, but it is unnecessary to go to this trouble for the hardy flower border.

BELLIS (Daisy).—This genus contains 3 or 4 species of small herbaceous perennials, with all radical toothed and stalked leaves. Flower heads solitary Involucre bell-shaped with bracts in 1–2 series. Receptacle conical. Pappus absent.

Culture and Propagation.— The cultivated forms of the common Daisy are beautiful and easily grown in moist loamy soils. After flowering they may be increased by dividing the crowns—each one making a separate plant. Division may also take place in spring, or indeed at almost any period of the year when the weather is mild and showery, but the separated portions should be placed rather firmly in rich loamy soil in a somewhat shaded position. Seeds may also be sown in March, but the seedlings often come single and are rarely worth multiplying. The only possible way to obtain a good collection of first class double-flowered Daisies is by means of division.

B. perennis (*Common Daisy*).—The double white, crimson, and striped varieties are the best. *Pink Beauty* is a charming pink with flat petals; *Rob Roy*, a rich red or crimson-quilled kind; *White Globe*, with large, white-quilled petals; *Aucubæfolia* is a handsome variegated sport with blotched and veined yellow leaves. The *Hen and Chicken Daisy* is similar in flower and leaf to the other double kinds, but when in bloom smaller flowers are developed all round the larger central one.

Culture &c. as above.

B. rotundifolia cærulescens (*Blue Daisy of Morocco*).—A beautiful perennial native of Morocco, with ovate or roundish, sinuate-toothed leaves on slender stalks 1–3 in. long. Flowers in summer, ¾ 1¼ in. across, with flowers like the Common Daisy, the ray-florets varying from white to blue or magenta-purple. This plant requires protection in winter except in southern parts of the country.

Culture &c. as above.

BELLIUM.—This genus differs from the Daisy in having a pappus of 6–8 broad scales torn at the apex, and alternating with an equal number of long rough bristles.

Culture and Propagation. — The plants thrive in sandy loam and peat, but are apt to exhaust themselves by their free-flowering propensities. They are increased by seeds sown in cold frames as soon as ripe; in hotbeds about March; or in the open border about the end of April and May. Except in the latter case, when the seedlings may be simply thinned out, they are pricked out into light soil, and by the end of May or beginning of June will be ready for the open border. The plants may also be increased by division of the roots in spring or early autumn. They are all suitable for the rockery.

B. bellidioides. — A pretty Italian annual about 4 in. high, with creeping stems, and spoon-shaped radical leaves. Flowers from June to September, white, solitary.

Culture &c. as above.

B. crassifolium.—A Sardinian perennial about 6 in. high, with many ascending stems, and thick rather downy obovate entire leaves, narrowed at the base. Flowers in June, whitish-yellow, on downy scapes longer than the leaves.

Culture &c. as above.

B. minutum.—A pretty little species about 3 in. high, native of the Levant. Leaves narrowly spoon-shaped, slightly hairy. Flowers from June to September, white and yellow, ½ in. across, on slender scapes.

Culture &c. as above.

CHARIEIS.—A genus having only the following species:—

C. heterophylla (*Kaulfussia amelloides*). — A beautiful compact-growing hairy annual, about 1 ft. high, native of S. Africa, and far better known in gardens under the name of *Kaulfussia*. It has oblong lance-shaped entire leaves, opposite below and alternate above. The beautiful flower-heads, with deep blue ray florets surrounding a blue or yellow disc, appear during April and May and stand well above the foliage.

There are several varieties known, such as *alba*, *atroviolacea*, *kermesina*, *rosea* &c., according to the colour of the flower-heads.

Culture and Propagation. — This is a beautiful plant for the rock garden or border, and flourishes in ordinary garden soil in open sunny situations. The seeds may be sown in cold frames when ripe, or in gentle heat about March, to obtain seedlings for the open air in May. To keep up a succession of bloom seeds may also be sown in the open border during April, afterwards thinning the seedlings out 12-18 in. apart.

BOLTONIA.—A genus of erect-growing Aster-like perennials with alternate, quite entire or coarsely toothed leaves, and medium-sized flower-heads in loose irregular panicles, or solitary at the tips of the shoots. Ray florets white or bluish. Involucre hemispherical. Receptacle convex or conical.

Culture and Propagation.—Boltonias may be grown exactly in the same way as the Starwort or Michaelmas Daisy Asters. They flourish in ordinary good and well-drained garden soil, and may be used in bold masses in the herbaceous border, the rockery, or shrubbery. They are readily increased by dividing the roots about September, or in spring, in mild showery weather. Seeds may also be sown as soon as ripe either in the open border or in cold frames, and cuttings of the young shoots, taken about April, and inserted in sandy soil in a cold frame shaded from the sun for a time, will soon root and make good plants. See *Aster* below, p. 500.

B. asteroides.—A native of the mountains of Carolina, 3-4 ft. high, with linear lance-shaped leaves, and rosy-white flowers with a yellow centre, produced in loose corymbs from June to August.

Culture &c. as above.

B. glastifolia.—A smoothish glaucous-looking N. American perennial 6-8 ft. high, with lance-shaped leaves, the lower ones of which are toothed. Flowers blush-white with a yellow disc, produced in corymbose panicles in August and September.

Culture &c. as above.

B. latisquama.—A free-flowering N. American perennial 3-4 ft. high, with bright green lance-shaped leaves, and numerous rosy or bright lilac flower-heads borne in large clusters from July to September.

Culture &c. as above.

CALLISTEPHUS (China Aster). The only species in this genus is:—

C. hortensis (*C. chinensis; Aster sinensis*). — A beautiful annual 1-2 ft. high, native of China. Leaves ovate, coarsely toothed, lower ones stalked; upper sessile, wedge-shaped at the base. Flowers from August to November, 2-4 in. or more across, beautiful mauve-purple with a bright yellow centre, very much resembling those of *Erigeron speciosus* (p. 506), but of a somewhat deeper shade of colour, broader ray-florets, and much larger flowers.

This is the description of the original species from which the numerous varieties of China Aster in cultivation have been produced. So much attention has been devoted to developing the progeny that the parent has been overlooked for very many years, and had dropped out of cultivation. Within the last year or two, however, it has been re-introduced, and it would be difficult to find a more graceful or useful plant for the flower border. It should be planted in bold masses to obtain striking effects. A light and warm rich soil produces the best results, and in the event of very dry weather copious supplies of water should be given either late in the afternoon or evening, or early in the morning, say between 6 and 8 o'clock. The plants will grow in shady places, but they are much finer in open sunny situations.

The florist's China Aster has been divided into about 30 distinct groups, such as the Pæony and Chrysanthemum-flowered; the Comet or Poodle, and Ostrich-flowered; the Victoria, the Emperor, the Anemone or Quilled; the Cocardeau or Crown; the Rose and the Porcupine, the Globe, the Pompon, and such like names—all more or less unmeaning to the amateur, but distinct enough to the specialist. The flowers of all these kinds are of course 'double,' and bear no resemblance whatever to the original species described above, except in so far that all the perfect tubular florets of the centre have been changed by cultivation into strap-shaped ones like those of the outer row.

China Asters are very fine in groups or masses in borders or in beds by themselves. They vary a good deal in height, and it is advisable when grouping to keep each section in a group by itself, to avoid unevenness. The colours vary from pure white to rose, pink, light and dark blue, mauve, scarlet, with intermediate shades, except yellow.

Culture and Propagation.—A deep rich loamy soil and open situations are best for China Asters. In hot dry summers the leaves are apt to become very much wrinkled and the flowers with unsightly ragged centres, unless a good supply of water is given regularly. To prevent evaporation as much as possible, and to keep the soil cool, a top dressing of spent mushroom-beds or other rotted manure may be given.

The plants are easily raised from seeds. These are usually sown in bottom heat in March, but they germinate freely in cold frames about the end of April, either in pots or shallow boxes or pans. They require to be pricked out, and made as sturdy as possible with light and air by the end of May, when they may be planted out.

Seeds ripen freely in the British Islands, but they cannot be relied upon to produce such fine flowers as the plants which have been raised from seed saved on the Continent, where the seasons as a rule have a more ripening effect than ours.

ASTER (Starwort; Michaelmas Daisy).—A genus containing about 200 species of herbaceous perennials (rarely biennials) mostly natives of N. America. Leaves alternate, entire, toothed or incised. Flower-heads in racemes or panicles. Involucre bell-shaped or hemispherical; bracts few or in many series. Receptacle flat or convex. Pappus hairs few or plentiful.

In speaking of these plants the term 'Starwort' seems to be on the whole more appropriate than 'Michaelmas Daisy,' although the latter term undoubtedly indicates the period when a large number, but by no means all, bloom. But such plants as *A. diplostephoides* for instance cannot be appropriately called Michaelmas Daisies.

Culture and Propagation.—Most Starworts are of easy culture in ordinary garden soil, and are readily increased by dividing the root growths in early spring. Seeds may also be sown, although many varieties readily reproduce themselves by this means naturally. They may be sown in light prepared soil in the open border as soon as ripe, but there will be a better chance of success by sowing in cold frames. The seedlings may be pricked out and grown on until the following September, or spring, when they may be transferred to their places in the flower border. Cuttings of the young shoots from the roots may also be taken about April or May, and inserted in sandy soil in a cool frame, or better still with a little bottom heat. They will soon root if kept shaded and sprinkled overhead for a short time, afterwards giving more air and light as they show signs of becoming established.

Of late years there has been a great revival in regard to the cultivation of Starworts, but notwithstanding several efforts to reduce them to order, they are still in a very mixed condition botanically. The fact is that many kinds readily intercross, and their progeny exhibit traces sometimes of one parent, sometimes of another, and these become further crossed with other species or varieties, and so on indefinitely.

As garden plants, Starworts are among the most beautiful and graceful of autumn flowers. With the disappearance of the Phloxes, and perennial Sunflowers, the Dahlias, Golden Rods, and many other beautiful flowers, the Starworts become conspicuous for their beauty and their lasting properties. They produce a wealth of starry blossom, beginning in July or August with such kinds as *acris*, *Amellus*, *lævis*, *Novi-Belgii*, and ending in November and December with *diffusus*, *ericoides*, and *grandiflorus*. For decorative purposes they are unsurpassed at this latter period of the year.

In habit of growth Starworts vary a good deal both in height and method of branching. Some are scarcely a foot high, while others often attain a height of 5 or 6 feet or more, according to soil and situation. The taller-growing kinds are valuable for the flower border, but to see their beauty to advantage they should be planted in bold masses. The dwarfer and more slender kinds are effective in the rock garden, the margins of shrubberies, and borders.

The following is a selection of the kinds worth growing. They are all natives of N. America except where otherwise stated.

A. acris.—A native of S. Europe 2 ft. or more high, with linear lance-shaped leaves, and blue flowers in August. The variety *dracunculoides* is a tall, free-flowered form; *nanus* is very dwarf, and useful for rockeries.

Culture &c. as above.

A. acuminatus.—About 2 ft. high, with broadly lance-shaped, long pointed leaves, and corymbs of white flowers in September.

Culture &c. as above.

A. alpinus.—A very attractive species 6-9 in. high, native of Europe, with more or less lance-shaped leaves. Flowers, in July, bright purple, 1-2 in. across. There are white and rose-coloured varieties, and also a vigorous one called *speciosus*, with larger flowers than in the type. The variety *altaicus* from Siberia is a very fine one, with bluish-purple flower-heads about 2 in. across. The form called *albus* has white flowers, and the one known as *ruber* red ones.

Culture &c. as above.

A. Amellus.—A fine Italian species about 2 ft. high, with roughish, oblong-lance-shaped leaves, and heads of purple flowers in August. The variety *amelloides* has dark lilac-purple flowers over 2 in. across; *bessarabicus* is rich lilac-purple; *linarifolius* grows taller than the type, has narrower leaves and deeper coloured flowers; *cassubicus* is chiefly remarkable for the bright golden centre surrounded with regular deflexed ray florets; and *major* has flowers about 2½-3 in. across, of a rich violet-purple colour.

Culture &c. as above.

A. amethystinus.—A pretty plant about 4 ft. high, with masses of small, bright lilac flowers from October to December.

Culture &c. as above.

A. Bigelovi.—A bushy perennial 1½-2 ft. high, with oval lance-shaped leaves and large bright lilac flowers produced in September and October.

Culture &c. as above.

A. cordifolius.—About 2 ft. high, with heart-shaped, finely serrated, stalked leaves, hairy beneath, and crowded racemes of small blue flowers in September and October. The variety *Diana* (or *Photograph*) is about 4 ft. high, erect and bushy, with pale lilac flowers; *albula*, flowers lilac and white, height 4 ft.; *elegans* (or *undulatus*), about 4 ft. high, with small, bright lilac flowers.

Culture &c. as above.

A. corymbosus (*Biotia corymbosa*).—This species has blackish-purple, brittle stems 2-3 ft. high, and heart-shaped, acute, coarsely toothed leaves about 3 in. long, lobed at the base. Flowers in August and September, about 1 in. across, white. There is a variety *Perseus* with bushy heads of numerous flowers.

Culture &c. as above.

A. diffusus.—A somewhat spreading species about 2 ft. high, with elliptic lance-shaped, serrate leaves, and heads of white flowers in October. The variety *horizontalis* branches horizontally, and has masses of red and white flowers. *Pendulus* (or *Nondescript*) grows taller and has white flowers about 1 in. across.

Culture &c. as above.

A. diplostephioides. — A beautiful downy or hairy perennial with stout stems 6-18 in. high, native of the Sikkim Himalayas. Leaves 2-4 in. long, obovate or oblanceolate, entire, narrowed into short or long stalks. Flowers in May and June, 2-3 in. across; ray florets bright purple; disc purple at first, afterwards yellow. Involucre broadly hemispherical, with lance-shaped bracts.

This species likes partially shaded spots and rich sandy peat loam.

Culture &c. as above.

A. dumosus.—A dwarf and compact species 1½-2 ft. high, with smooth, linear leaves and beautiful white or mauvy-pink flowers about ½ in. across, in October.

Culture &c. as above.

A. ericoides.—A pretty species about 3 ft. high, with smooth, linear, Heath-like leaves. Flowers in September, white, numerous. The variety *Clio* has pale pink flowers about 1 in. across.

Culture &c. as above.

A. graminifolius. — A pretty little species less than 6 in. high, with erect stiffish slender stems and linear green leaves ½-¾ in. long. The white Daisy-like flower-heads appear in May and June, and are borne singly at the ends of the shoots.

Culture &c. as above.

A. grandiflorus.—A fine species 2-3 ft. high, with rigid linear acute and somewhat clasping leaves. Flowers in November and December, deep violet, large.

Culture &c. as above.

A. Herveyi.—A rather roughish slender-growing perennial 1-2 ft. high, with ovate lance-shaped obscurely serrate leaves, and bright lilac or violet flowers about 1½ in. across produced in autumn.

Culture &c. as above

A. lævis.—A beautiful species varying from 2 to 6 ft. high, with somewhat stem-clasping, oblong entire or slightly serrated, shining leaves. Flowers from August to October, various shades of lilac and purple. There are many varieties, of which the best are *Ariadne*, *Apollo*, *Arachne*, *Arcturus*, *Calliope*, *decorus*, *floribundus*, *Harvardi*, *Pygmalion*, *Vesta*, and *Virgil*.

Culture &c. as above.

A. linarifolius. — This species rarely exceeds 2 ft. in height, and has the stems clothed with narrow linear Flax-like leaves all the way up to the flower-heads. The latter are rather small, with deep violet ray florets and a yellow centre.

Culture &c. as above. This species must not be confused with the variety of *A. Amellus* having the same name.

A. lindleyanus. — A showy perennial 1–2 ft. high. Lower leaves ovate and somewhat heart-shaped with winged stalks; upper ones sessile, serrate, and tapering at each end. Flowers pale violet, about 1½ in. across, produced in loose panicles in autumn.

Culture &c. as above.

A. Linosyris (*Chrysocoma Linosyris; Linosyris vulgaris*).—*Goldilocks.* A distinct native plant about 2 ft. high, with linear Flax-like leaves, and showy yellow flowers produced in August and September.

Culture &c. as above.

A. longifolius.—About 3 ft. high, with very long, smooth, linear-lance-shaped leaves, rarely toothed. Flowers in October, white, 1 in. across, in dense panicles. The variety *formosus* has pink flowers.

Culture &c. as above.

A. Michelli.—A pretty dwarf herbaceous perennial about 1 ft. high, native of Austria. Leaves in a rosette, shortly stalked, obovate, wavy-edged. Flowers in June, white, solitary. This plant was formerly known as *Bellidiastrum*.

Culture &c. as above. Easily grown in loam, leaf soil and peat, and increased by division in early spring or autumn.

A. multiflorus.—A free-flowering species 3–4 ft. high, with much-branched, downy stems, and smooth linear leaves. Flowers in September, white, small, borne in large corymbs.

Culture &c. as above.

A. Novæ-Angliæ.—This fine species grows from 4 to 6 ft. high, with simple hairy stems, and linear lance-shaped, hairy, stem-clasping leaves, lobed at the base. Flowers in September, purple. The variety *pulchellus* has large, deep violet flowers; *præcox*, purple flowers; *roseus*, pale rose, and *rubra*, deep rose flowers; *Wm. Bowman*, rich rose-purple, and *Woolston*, fine blue shade.

Culture &c. as above.

A. Novi-Belgii.—A handsome species 3–6 ft. high. Leaves somewhat stem-clasping, lance-shaped, smooth, rough-edged, slightly serrated. Flowers from August to October, pale blue.

Like *A. lævis*, this species also has many forms, some very fine, among them being:—*Archer-Hind*, flowers 1–2 in. across, pale rose-lilac; *Argus*, *Aurora*, *Berenice*, *densus*, *Harpur Crewe*, flowers 1–2 in. across, white, tinged with rose when old; *Janus*, white and rosy-purple; *John Wood*, white; *lævigatus*, deep rose; *Minerva*, deep rose-lilac; *nanus*, dwarf grower with rose flowers; *Proserpine*, rose-lilac; *Purity*, white; *Ravennæ*, rosy-lilac; *Robert Parker*, lilac-purple.

Culture &c. as above.

A. paniculatus.—A pretty species about 4 ft. high, with ovate lance-shaped, somewhat serrated, stalked leaves. Flowers in August and September, light blue. The variety *W. J. Grant* has blush-white or pale mauve flowers, very free, useful for cutting. *Dot* has small white flowers tipped with rose.

Culture &c. as above.

A. patens.—A fine plant with procumbent stems, 1–2 ft. long. Leaves oval-pointed, with a broad clasping base. Flowers in autumn, about 1 in. across, purple-blue.

Culture &c. as above.

A. peregrinus.—A pretty little species about 1 ft. high, suitable for the rockery. Leaves lance-shaped, acutish, entire. Flowers in July and August, bluish-purple, 2 in. across.

Culture &c. as above.

A. Pseudamellus.—A beautiful bushy Himalayan species 6–18 in. high, with oblong blunt and obscurely toothed leaves. The bluish-purple flower-heads, each 1–2 in. across, are borne in August and September in corymbose clusters at the top of the stems.

Culture &c. as above. In many

gardens this species does not succeed very well.

A. ptarmicoides. — A pretty plant about 2 ft. high, with linear roughly toothed leaves, and small white flowers in September. This does not grow well in all places.

Culture &c. as above.

A. puniceus.—A graceful plant 4–6 ft. high, with stem-clasping, lance-shaped, serrate, roughish leaves. Flowers in August and September, blue or rosy-lilac, about 1 in. across, in large pyramidal panicles. The variety *lucidulus* has pale lilac flowers 1½ in. across; *pulcherrimus* has white flowers tinted with lilac; ray-florets deflexed.

Culture &c. as above.

A. pyrenæus. — A Pyrenean species 1–1½ ft. high, with roughish, oblong lance-shaped acute leaves without stalks and serrated towards the apex. Flowers in July, large, lilac-blue, with a yellow centre.

Culture &c. as above.

A. Reeversi.—A pretty species 9-12 in. high, with linear acute leaves, and dense panicles of small white flowers, with a yellow centre, produced in autumn.

Culture &c. as above.

A. sericeus. — A greyish, slender-stemmed plant 1–2 ft. high. Leaves lance-shaped, silky, 1–3 in. long. Flowers late in summer and autumn, deep blue, about 1½ in. across.

Culture &c. as above.

A. Shorti.—A pretty species 2–4 ft. high, with more or less lance-shaped tapering leaves 3–5 in. long. Flowers in autumn, purple-blue, about 1 in. across.

Culture &c. as above.

A. sibiricus. — A Siberian species about 2 ft. high. Leaves lance-shaped, serrate, hairy, rather stem-clasping. Flowers in August, blue, with hairy bracts.

Culture &c. as above.

A. sikkimensis.—A native of Sikkim, about 3 ft. high. Leaves lance-shaped pointed, spiny-toothed, upper ones without stalks. Flowers in October, purple.

Culture &c. as above.

A. spectabilis.—A handsome species about 2 ft. high, with roughish, lance-shaped, stem-clasping leaves, lower ones more or less serrate. Flowers in August, blue.

Culture &c. as above.

A. Stracheyi. — A native of the Western Himalayas. Lower leaves 1–2 in. long, oblanceolate or obovate, shortly stalked. Flowers in May, pale lilac-blue, 1–1½ in. across, on red-brown scapes 3–6 in. high.

Culture and Propagation.—This is a charming plant for furnishing partially shaded spots in the rockery. It has creeping stems which root at the tips, so that left undisturbed a plant soon spreads over a good area, and makes a beautiful carpet of green beneath the lilac-blue blossoms. It may be easily increased in autumn or spring by detaching the runner-like shoots.

A. Sturi.—This is one of the smallest growing Asters with a dense compact habit. The small Box-like leaves are almost evergreen and make a pretty carpet on the ground. The flowers are large for the size of the plant; they are pure white, and last for several weeks in early spring.

Culture &c. as above. An excellent rock plant.

A. tardiflorus.—A vigorous species about 3 ft. high, with oblong lance-shaped leaves. Flowers in autumn, pale rosy-lilac; centre at first yellow, afterwards purplish.

Culture &c. as above.

A. Thomsoni.— A handsome Himalayan perennial 1–3 ft. high, the whole plant being more or less hairy and whitish-green in appearance. Leaves 3–4 in. long, oval, with coarsely toothed margins. The lilac flower-heads, with conspicuous yellow centres, appear from July to October, and are borne in loose corymbs, or sometimes solitary.

Culture &c. as above. Easily increased by division in autumn or spring; or by seeds.

A. Townshendi.—A fine species 3–4 ft. high, native of the Rocky Mountains. It has somewhat hairy stems and blunt spoon-shaped leaves 8–12 in. long, the upper ones oblong ovate-acute. It bears a profusion of bright violet-blue flower-heads 2–3 in. across in July and August.

Culture &c. as above.

A. Tradescanti. — A graceful species about 4 ft. high, with lance-shaped, serrated, Heath-like leaves. Flowers in August and September, white, numerous.

Culture &c. as above.

A. tricephalus.—A native of Sikkim. Lower leaves obovate, spoon-shaped, with long winged stalks; upper ones oblong, somewhat stem-clasping. Flowers in July and August, purple, large, and showy.

Culture &c. as above. This species grows 1–3 ft. high and is perfectly hardy. It has creeping rootstocks and is easily increased by division in autumn or spring.

A. trinervius. — A beautiful species closely related to *A. sikkimensis*, and native of the Himalayas. It grows 2½–4 ft. high, and has lance-shaped coarsely toothed leaves 3–4 in. long. The white or pale bluish-purple flower-heads, over an inch across, are borne in loose clusters from August to October.

Culture &c. as above.

A. turbinellus. — A handsome plant 2–3 ft. high, with lance-shaped, somewhat stem-clasping ciliated leaves. Flowers in summer and autumn, delicate mauve.

Culture &c. as above.

A. umbellatus.—A tall-growing plant 5–8 ft. high, with masses of white flowers with yellow centres borne in autumn.

Culture &c. as above.

A. undulatus. — About 3 feet high, with hairy stems. Leaves oblong heart-shaped, stem-clasping, with winged stalks. Flowers in August, white, changing to purple.

Culture &c. as above.

A. versicolor.—A pretty, rather prostrate species 9–15 in. high, with smooth oblong lance-shaped, tapering leaves, lower ones serrate, stalked; upper ones sessile, stem-clasping. Flowers in September, 1 in. across, white to rose or lilac. The variety *Antigone* grows about 3½ ft. high, and is less bushy than the type.

Culture &c. as above.

A. vimineus.—A pretty bushy species, about 2½ ft. high, with narrow linear leaves. Flowers in September, white, ½ in. across, numerous. The variety *Cassiope* is somewhat taller, with white and lilac flowers; and *nanus* is dwarfer in habit.

Culture &c. as above.

OLEARIA (Daisy Tree).—A genus consisting of 85 species of arborescent shrubs or bushes, rarely herbs, with alternate or rarely opposite entire or toothed leaves. Flower heads solitary, corymbose or paniculate. Involucre ovoid, bell-shaped, or hemispherical. Disc flat or somewhat convex, pitted. Achenes smooth or slightly flattened. Pappus bristly.

Culture and Propagation. — It is practically useless to grow Olearias in cold bleak parts of the country, although *O. Haasti* is recorded as having been uninjured by 13° frost in the gardens of Alnwick Castle, Northumberland. The other species, however, have not been proved quite so hardy. They like rich loam, but do well in ordinary garden soil, and make good bushes for the border or shrubbery. To increase the plants, cuttings of the half-ripened young shoots 4–6 in. long should be inserted in sandy soil in a close cold frame, or handlight, and kept shaded until nearly rooted. Cuttings of the ripened shoots may be inserted in the same way about September, and by the following spring will be well rooted. Seeds of some of the Daisy Trees (e.g. *O. Haasti* and *O. macrodonta*) are ripened freely in our climate, and may be sown in cold frames when fully ripe, or in spring in gentle heat. The seedlings are to be pricked out when large enough, and may be grown on in cold frames until they have made sturdy little bushes. Plants raised from seeds ripened in the British Islands are far more likely to stand the severities of our winters than are those raised from imported seeds.

O. dentata.—An Australian shrub with elliptic or heart-shaped ovate crenate leaves 1½–2 in. long, and rosy-white flower heads about 1¼ in. across with a bright yellow centre.

Culture &c. as above. Hardy only in the mildest parts of the kingdom.

O. Forsteri.—A New Zealand shrub with oblong blunt wavy leaves 2–3 in. long, downy white beneath. Flower-heads white, corymbose.

Culture &c. as above.

O. Haasti. — A pretty New Zealand shrub 2–4 ft. high, with hoary young shoots, ovate oblong or elliptic leaves about 1 in. long, white beneath and somewhat resembling those of the Box tree. Flowers in August, small, white, Daisy-like, borne in hoary cymes in great profusion, literally covering the bushes.

Culture &c. as above.

O. insignis.—A beautiful New Zealand shrub, with thick leathery elliptic rounded leaves, 3–5 in. long, 2 in. broad, shining green above, covered with a pale brown woolly felt beneath, as are also the branches. Flowers large Daisy-like, 2 in. or more across, white, with a yellow centre, and borne on stalks 6–9 in. long. They last for a month or 6 weeks in perfection.

Culture &c. as above. This charming plant unfortunately is too tender for cultivation in the open air except in the very mildest parts of the south of England and Ireland, and parts of the south-west coast and islands of Scotland. If it could only be got to ripen seeds, it might be possible to raise plants with a hardier constitution in the course of time.

O. macrodonta. — A New Zealand shrub with elliptic coarsely toothed Holly-like leaves, which emit an agreeable musky scent when bruised. Flowers in June and July, Daisy-like, white, borne in large roundish heads.

Culture &c. as above. In the south of England and Ireland this species is perfectly hardy and flowers freely. It attains a height of only 3 or 4 feet, but in a wild state as much as 20 ft. It may be mentioned that another name for this plant is *O. dentata*, which must not, however, be confused with the plant under that name described above. A species called *O. ilicifolia* is very similar to *O. macrodonta*, but is a much smoother plant.

O. nitida. — A handsome compact-growing New Zealand shrub with ovate leathery leaves about 2 in. long, the under surface of which, as well as the young branches, are covered with a thick silvery-white down. The small white flowers, with a bright yellow centre, are produced in great profusion in August and September in crowded clusters.

Culture &c. as above. This has proved hardy in the south of Ireland.

O. nummularifolia. — A more or less clammy New Zealand shrub, 1–10 ft. high, with roundish oblong or obovate hard leathery leaves, shining green above, covered with white or yellowish down beneath. Flowers in July, white or yellowish. Quite hardy in the south of Scotland.

Culture &c. as above.

O. ramulosa (*Eurybia ramulosa*).—A graceful Tasmanian bush, the leaves and branches of which are covered with a roughish down. The leaves are oblong linear, about ½ in. long, woolly beneath, and crowded on the shoots. The white Daisy-like flowers are borne in great profusion in September and October in elegant arching sprays, which look very attractive.

Culture &c. as above.

O. stellulata (*Eurybia Gunniana*).—A handsome Tasmanian shrub 3–5 ft. high, with hoary branches and oblanceolate coarsely toothed leaves, hoary on the under surface. Flowers in September, ¾ in. across, white, in great profusion.

Culture &c. as above. Requires protection in winter in cold districts.

O. Traversi (*Eurybia Traversi*).—A handsome evergreen tree, native of Chatham Island, New Zealand, where it reaches a height of 30–35 ft. It has opposite (not alternate as in most species) leaves, more or less ovate lance-shaped in outline, about 2½ in. long, quite entire, smooth shining green above, paler and silky beneath. The creamy white flowers are individually very small, but they are borne in clustered panicles in the axils of the leaves and at the ends of the shoots in great profusion late in summer.

Culture &c. as above. This species can be grown in the open air with any degree of success only in the mildest parts of the kingdom.

ERIGERON (Fleabane).—A genus consisting of about 100 species of annual, biennial, or perennial herbs resembling the Starworts (Aster), from which they differ chiefly in having the ray florets in several series. The upper (or cauline) leaves are alternate, entire, toothed, or rarely incised or dissected. Ray florets violet or white, disc usually yellow. Involucre hemispherical or bell-shaped. Receptacle flat or slightly convex.

Culture and Propagation.—Only a few species are of any garden value. They thrive in somewhat moist garden soil and are readily increased by division of the roots in spring or early autumn. They may also be raised from seeds sown as soon as ripe in cold frames, or in spring, afterwards transferring the seedlings to the open border when large enough. They are excellent plants for the rock garden, or in front of the herbaceous border, but to obtain the finest effects they should be grown in bold masses.

E. alpinus.—A pretty native hairy perennial, 9–12 in. high, suitable for rockeries. Leaves oblong lance-shaped below, linear oblong above. Flowers in July and August, ¾ in. across, purple, with a yellow centre. The variety *grandiflorus* is superior to the type.

Culture &c. as above.

E. aurantiacus.—A native of Turkestan 9–12 in. high. Leaves oblong entire, upper ones lance-shaped, sessile. Flowers in early and late summer, about 2 in. across, bright orange, solitary, on a stout erect peduncle.

Culture &c. as above. This species is remarkable for the bright orange-yellow of its flowers, so utterly distinct from other species of Erigeron. It may be increased by division, but not quite so rapidly as some others, and it is therefore advisable where a large stock is required to obtain plants from seeds also.

E. caucasicus.—A Caucasian perennial 9–12 in. high, with lower leaves spoon-shaped, upper ones strap-shaped, stem-clasping. Flowers in summer, about 1 in. across, rosy-pink, or purple, in loose masses on stems nearly 2 ft. high.

Culture &c. as above.

E. glabellus.—A N. American perennial 6–18 in. high. Leaves oblong lance-shaped, pointed above, spoon-shaped and stalked below. Flowers in June, light blue or purple, with a yellow centre.

Culture &c. as above.

E. glaucus. — A native of N.W. America 6–12 in. high, of creeping habit. Leaves oblong ovate or somewhat spoon-shaped, ciliated, glaucous, clammy, lower ones with winged stalks, upper ones sessile. Flowers in summer and autumn, lilac-purple.

Culture &c. as above. This is an evergreen species and retains its foliage during the winter months. It is easily increased by division.

E. grandiflorus.—A Rocky Mountain perennial 4–8 in. high. Lower leaves obovate spoon-shaped, upper ones oblong to lance-shaped. Flowers late in summer, purple or whitish, rather large.

Culture &c. as above. This species makes fine evergreen masses of foliage, and may be used as a carpeting for taller plants. Easily increased by division.

E. mucronatus (*Vittadinia triloba; V. australis*).—A much-branched, spreading perennial 6–12 in. high, native of Australia and New Zealand. Leaves wedge-shaped or narrowly spoon-shaped, 3–5-lobed at the apex. Flowers during summer, ray florets white tipped with pink; disc florets yellow.

Culture &c. as above.

E. multiradiatus.—A pretty Himalayan plant 6–24 in. high, with oblong, toothed leaves tapering into a long stalk. Flowers in summer, about 2 in. across, purple with a yellow centre.

Culture &c. as above.

E. Roylei. — An ornamental species 4–8 in. high, with smooth, oblong spoon-shaped, ciliated leaves. Flowers in summer, 2 in. across, bluish-purple, with a yellow centre, borne in loose corymbs. This species is also a native of the Himalayas.

Culture &c. as above.

E. salsuginosus.—A pretty N. American perennial 12–18 in. high, with creeping rootstocks, and forming dense masses of foliage close to the ground. The soft mauve-tinted flowers with a yellow centre are about 3 in. across, appear in May and June, and are very effective when seen in bold masses.

Culture &c. as above.

E. speciosus (*Stenactis speciosa*).— A showy N. American perennial about 2 ft. high. Lower leaves spoon-shaped, long-stalked; upper ones lance-shaped acute, sessile, 2–4 in. long. Flowers in summer, violet-purple, 2 in. or more across, in corymbose heads; centre yellow. The variety *superbus* is a larger and finer flower, approaching in appearance smaller forms of the typical *Callistephus hortensis* described at p. 499.

Culture &c. as above. This is the best known of all the Erigerons. It makes dense tufts close to the ground, and produces an immense number of blossoms. Easily increased by division.

Tribe IV. INULOIDEÆ.—Leaves usually alternate, entire, rarely opposite or lobed.

ANTENNARIA.—A genus of perennial herbs, closely related to *Gnaphalium*, and distinguished by the dry, coloured, chaffy scales around each head of tubular flowers, the stamens and pistils of which are on different plants (diœcious). Leaves clustered, entire.

Culture and Propagation. — The Antennarias are pretty plants, suitable for the rock garden, borders, or edgings. They thrive in light garden soil, and may be increased by division of the root in spring, or from seed sown at the same season in cold frames, or in the open border in April.

A. dioica (*Gnaphalium dioicum*).—*Cat's Foot.*—A British plant, found on heaths and sandy pastures, with procumbent shoots, and spoon-shaped or lance-shaped woolly leaves. Flowers in June, pink, in crowded corymbs 3–4 in. high. The variety *hyperborea* has more woolly leaves than the type; and *minima* is a small-growing form.

Culture &c. as above.

A. margaritacea (*Pearl Everlasting*). A native originally of N. America, but now found wild in parts of the British Islands and the Continent. It is about 1 ft. high, with linear lance-shaped acute leaves, downy white, especially beneath. Flowers in July and August, white, ½ in. across, borne in corymbose clusters.

Culture &c. as above.

A. tomentosa (*A. candida*).—A dwarf silvery plant, considered to be a variety of *A. dioica*. It grows scarcely 1 in. high, and forms a dense carpet of silvery white in a short time, and is a favourite for edging, carpet-bedding, or for rockeries.

Culture &c. as above.

LEONTOPODIUM (LION'S FOOT; EDELWEISS).—A genus with 4 or 5 species of tufted woolly perennial herbs. Lower leaves rather spoon-shaped, upper ones alternate, entire. Flower-heads small, in dense cymes at the tips of the branches.

L. alpinum (*Gnaphalium Leontopodium*).—*Edelweiss.*—A pretty Swiss alpine plant 3–6 in. high, with white woolly leaves. Lower ones lance-shaped, narrowed into a stalk, upper ones sessile, linear oblong. Flowers in June and July, small, yellow, surrounded by an irregular rosette of densely woolly bracts.

Culture and Propagation.—The Edelweiss may be easily raised from seeds sown in slight heat about March. The plants grow well in exposed sunny spots in the rock garden or border, in rather sandy soil. Established plants may be divided annually, but it is easier and more satisfactory to raise them from seeds in the same way as recommended for annuals in general at p. 78.

GNAPHALIUM (CUD WEED; EVERLASTING).—A genus containing about 100 species of annual, biennial, or perennial herbs, few of which are of any garden value. Leaves alternate, sessile, decurrent, or rarely stalked. Flower-heads small, sessile, often clustered, rarely in terminal corymbs. Bracts of the involucre scarious, often coloured at the tips.

G. lanatum. — A plant about 1 ft. high, chiefly valued for its beautiful silvery foliage, and much used for edging borders and beds.

Culture and Propagation. — This is practically the same as for Antennaria above. It thrives best on dry poor soils, and makes fine masses if pegged down. Easily increased by division in spring or early autumn.

OZOTHAMNUS.—A genus of shrubs or rarely herbs, closely related to Helichrysum. The flower-heads are small and often few-flowered. Involucre oblong ovoid or bell-shaped, the inner bracts usually tipped with a coloured point.

O. rosmarinifolius.—A beautiful fragrant shrub, native of Australia and Tasmania, where it attains a height of 6–10 ft. The branches are furnished with blunt linear Rosemary-like leaves, the edges of which are turned up or down. The small white flower-heads appear in July and August and are borne in great profusion in dense clusters.

Culture and Propagation.—This plant flourishes in ordinary good garden soil and is practically hardy in the southern and western parts of the kingdom. It should be planted in warm sunny positions, and may be increased by inserting cuttings of the half-ripened flowerless shoots in sandy soil about August under a handlight, keeping them shaded from the sun and sprinkled overhead occasionally.

WAITZIA.—A small genus of erect annuals (or perennials) with alternate linear entire leaves, and flower-heads often borne in corymbose clusters. Involucre bell-shaped, hemispherical or roundish, yellow or white. Receptacle flat.

Culture and Propagation.—Waitzias flourish in ordinary garden soil in open sunny situations. They are all natives of Australia, where they are more or less of a perennial character. In our climate, however, it is easier to treat them as tender annuals and raise them from seeds sown in gentle heat about March, and plant the seedlings out at the end of May. They are good plants for the border, and their flowers when cut and dried in autumn may be kept for room decoration like other 'Everlasting' flowers, such as Rhodanthè, Helichrysum &c.

W. aurea.—A pretty species 12–18 in. high, with rosettes of linear leaves and shining golden flower-heads borne in loose clusters in summer and autumn.

Culture &c. as above.

W. corymbosa (*W. acuminata*).—A roughly hairy or downy plant 12–18 in. high, with stems branching from the middle upwards, clothed with linear leaves. Flowers satiny-white, rose, or yellow.

Culture &c. as above.

W. grandiflora. — This species resembles *W. aurea* in height, habit, and appearance, but produces much larger heads of bright yellow blossoms.

Culture &c. as above.

HELIPTERUM. — A genus closely allied to *Helichrysum*, from which it differs in having the hairs of the pappus plumose or feathery instead of roughly hairy.

Culture and Propagation.—Helipterums require rich soil and warm positions, otherwise they are hardly worth growing out of doors. Seeds may be sown outside in April, but are better raised in heat early in March. The seedlings are grown on until June, when they may be put outside in masses in the flower border. For the general treatment of annuals see p. 78.

H. humboldtianum (*H. Sandfordi*).—A pretty woolly-white West Australian annual 1–1½ ft. high, with lance-shaped linear leaves. Flowers in summer, bright yellow, passing into a metallic green when dry.

Culture &c. as above.

H. Manglesi (*Rhodanthe Manglesi*). A native of Western Australia 1–1½ ft. high, with ovate-oblong or broadly lance-shaped leaves, with rounded stem-clasping auricles at the base. Flowers in summer, soft rosy-pink with yellow centres, on long stalks.

Culture &c. as above.

H. roseum (*Acroclinium roseum*).—A pretty Australian annual 1–2 ft. high, with linear acute leaves and beautiful rosy flowers on the ends of the slender branches. When picked young the flower-heads may be dried as 'Everlastings.' There is a white variety *album*, and a large rose variety, *grandiflorum.*

Culture &c. as above.

HELICHRYSUM (EVERLASTING; IMMORTELLE).—A large genus containing 260 species of herbaceous or shrubby plants, mostly natives of S. Africa. Flower-heads large, solitary. Bracts of the involucre scarious, not silvery, spreading or recurved. Pappus rough or somewhat feathery.

Culture and Propagation. — The following are the only Helichrysums of note for the garden. They thrive in rich loamy soil, and should be grown in bold masses in the flower-border. Seeds are sown in slight heat in March, and are pricked out and grown on until June, when they can be put out in the same way as other annuals, see p. 78. Flowers for drying should only be half open, and hung downwards in bunches in a cool airy place to come to perfection.

H. arenarium (*Yellow Everlasting*).—A native of Europe 6–12 in. high, with lance-shaped entire, stem-clasping leaves, downy white on both surfaces. Flowers in summer, bright golden-yellow, borne in compound corymbs.

Culture &c. as above.

H. bracteatum.—A beautiful Australian annual 3–4 ft. high, with entire lance-shaped leaves, and variously coloured flowers in August. There are several fine varieties, with flowers varying in colour from pure white to rose, light and pale yellow. There are also handsome forms in which the central (or disc) florets have become changed from a tubular to a strap-shaped form, and this change has given a double-flowered race. The colouring among these double forms is very varied, and white, red, yellow, carmine, purple and intermediate shades are to be met with. *H. acuminatum*, *H. chrysanthum*, and *H. macrocephalum* are mere forms of this species.

Culture &c. as above.

CASSINIA. — A genus containing about 20 species of shrubby plants having alternate entire leaves, the margins of which are often turned upwards, and the under surface often woolly. The small yellow flower-heads are borne in corymbs or panicles at the ends of the branches. Involucre narrowly ovoid or oblong with bracts in several rows. Receptacle flat or slightly convex.

C. fulvida (*Diplopappus chrysophyllus*).—*Golden Heath.*—A very distinct shrub 2–8 ft. high, native of New Zealand. The erect yellowish branches are furnished with short linear oblong Heath-like leaves which are deep green above and golden-yellow beneath, the margins being curled upwards, thus exposing in a conspicuous manner the colour of the under surface. The small yellow flower-heads appear in July and August, but are not particularly attractive although they add still further to the prevailing golden colour of the plant. From its small leaves and slender branches, and the general resemblance to the Heaths (see p. 580), it has been called the 'Golden Heath,' although as may be seen from its position in this work it has little in common with the plants of that genus.

Culture and Propagation.—This is the species best known in cultivation, although one or two others are to be met with occasionally in botanical collections. It flourishes in well-drained peat, and is practically hardy in most parts of the kingdom when placed in sheltered spots. It may be increased by means of cuttings of the half-ripened flowerless shoots, which should be inserted in very sandy peat and loam about August, and covered with a handlight or bell-glass until fairly well rooted. The cuttings must be shaded from sunshine and attention must be given to sprinkling overhead and ventilation as they begin to root. Seeds are ripened freely, and may be sown when ripe in cold frames in sandy peat and loam. When the seedlings have grown large enough they should be pricked out into a similar compost, and afterwards grown on in various sized pots until large and strong enough to be planted out of doors—an operation best performed in mild weather in spring.

C. leptophylla (*Diplopappus leptophyllus*). — An attractive New Zealand shrub 2–8 ft. high, with grey and purplish stems covered with small fleshy green obovate leaves about ⅛ in. long. The small white flowers are borne at the ends of the shoots in July, but are not very showy.

Culture &c. as above for *C. fulvida.*

C. Vauvilliersi.—This is also a native of New Zealand, and is a more vigorous and handsome plant than *C. leptophylla.* The yellowish branches are covered with obovate leaves about ¼ in. long, and the young shoots have a beautiful golden-tinted colour. Flowers as in *C. leptophylla.*

Culture &c. as above for *C. fulvida.*

PODOLEPIS.—A genus containing about a dozen species of more or less woolly annuals or perennials with alternate lance-shaped or linear, entire leaves, often stem-clasping at the base. Flower-heads with yellow, rosy, or violet ray-florets.

Culture and Propagation.—These are pretty plants for the border. They like a well-drained sandy soil and open sunny situations, as they are all natives of Australia. They may be raised from seeds annually in the same way as the Ammobiums, and also by sowing in the open border in April.

P. acuminata.—This grows about 18 in. high, and has lance-shaped stalked leaves, the lower ones stem-clasping. The yellow flower-heads appear in summer and autumn.

Culture &c. as above.

P. aristata (*P. chrysantha*).—This is very similar to *P. acuminata*, but is distinguished by the silkiness of the reddish involucral bracts. The leaves also are more pointed and glaucous beneath, and the beautiful golden-yellow flower-heads appear in summer and autumn.

Culture &c. as above.

P. gracilis. — A very pretty species about 18 in. high with reddish stems, sessile lance-shaped acute leaves, and beautiful rosy, lilac, or white flower-heads in summer and autumn.

Culture &c. as above.

AMMOBIUM.—A genus of hoary, woolly perennials, with alternate or clustered entire leaves. Flowers yellow, in hemispherical heads. Receptacles convex. Pappus membanous-chaffy, shortly cup-shaped. Achenes angled, smooth or papillose.

A. alatum. — A beautiful Australian 'Everlasting,' 1½–2 ft. high, with winged stems. Leaves oblong lance-shaped, lower ones in tufted rosettes. Flowers from May to September, about 1 in. across, silvery white, with yellow centres; in loose, corymbose panicles. The variety *grandiflorum* has much larger and purer white flowers than the type, and comes true from seed.

Culture and Propagation.—This plant is best treated as a half-hardy annual or biennial, but in warm, sandy soil it becomes a perennial. Seeds may be sown in a cold frame in September, and the seedlings protected during the winter. Or they may be sown in slight heat about February or March, so as to be ready for the border about June. For the general treatment of annuals and biennials see p. 78.

INULA.—A genus containing less than 60 species of herbaceous perennials with radical or alternate, entire or serrate leaves. Flower-heads yellow; ray florets rarely white, strap-shaped, numerous; disc florets very numerous, tubular, hermaphrodite. Involucre hemispherical, with bracts spreading at the points. Receptacle flat or nearly so, pitted or honeycombed.

Culture and Propagation. — Inulas grow well in ordinary garden soil, and are easily increased in early autumn or spring by dividing the roots, or by seeds, the latter being sown either when ripe in cold frames or in spring in the open border if more plants are required than can be obtained by division. By cutting the roots into pieces about 2 in. long, and slightly covering them with light and rich sandy soil and placing in gentle heat during the winter or early spring months a good supply of plants can also be obtained. Being vigorous and somewhat coarse in growth, they are more suitable for wild or rough parts of the garden. The best results are obtained by good cultivation, and a good top-dressing of manure in autumn or winter is very beneficial.

I. glandulosa.—A hairy-stemmed Caucasian species, about 2 ft. high, with sessile, oblong, obscurely serrated leaves. Flowers in July and August, orange-yellow, 4–6 in. across, with hairy involucres, and long narrow ray florets.

Culture &c. as above. This species does not seed freely in some localities, but it may be easily increased by division of the roots and also by root cuttings.

I. grandiflora.—This is a fine Himalayan perennial about 2 ft. high, and somewhat resembling *I. glandulosa.* The flower-heads appear in summer and are quite as large as those of *I. glandulosa*, and of a bright orange-yellow colour.

Culture &c. as above.

I. Helenium (*Elecampane*).—A strong-growing British perennial, 3–4 ft. high. Leaves oblong stalked below, ovate serrate wrinkled and sessile above. Flowers in summer, yellow, in large solitary heads about 3 in. across.

Culture &c. as above.

I. Hookeri.—A native of the Sikkim Himalayas 1–2 ft. high. Leaves 3–4 in. long, sessile or narrowed into short stalks, oblong lance-shaped, pointed, minutely toothed, hairy above, downy beneath. Flowers in September, pale yellow, in somewhat sweet-scented heads, 2½–3½ in. across; ray florets linear, 1 in. or more long; involucre broad, shaggy.

Culture &c. as above.

I. Oculus Christi. — An ornamental perennial 1½–2 ft. high, native of Eastern Europe. Leaves broadly lance-shaped, obtuse, entire or slightly toothed, rather downy. Flowers in summer, bright golden-yellow, 3½ in. or so across. Involucre very downy.

Culture &c. as above.

BUPHTHALMUM.—A genus containing 4 species of loosely branched, or tall, smooth, rough, or hairy perennials with alternate entire or toothed leaves. Flower-heads large, yellow, solitary at the ends of the stems. Receptacle convex. Achenes smooth.

Culture and Propagation. — Buphthalmums grow well in ordinary garden soil, and are easily increased by division of the roots in early spring or autumn. Seeds are ripened freely, and may be sown when ripe in cold frames, or in spring. The seedlings are pricked out and transferred to the open air when large enough. It is, however, scarcely necessary to increase the stock from seeds, as the plants are so easily divided.

B. grandiflorum.—A pretty Austrian plant 1½–2 ft. high, with alternate lance-shaped, slightly toothed, smooth leaves. Flowers from June to October, yellow, large; involucre naked.

Culture &c. as above. Grows well in shade.

B. salicifolium. — Also a native of Austria, 1½–2 ft. high. Leaves oblong-lance-shaped, somewhat serrated, hairy. Flowers in June, yellow, large, solitary.

Culture &c. as above.

B. speciosum (*Telekia speciosa*).—A vigorous S. European perennial about 3 ft. high, with large, heart-shaped, coarsely toothed, bright green leaves 9–12 in. long, with long, channelled stalks. Flowers in July, deep orange-yellow, 4 in. across, with reddish-brown centres, very much resembling those of *Inula glandulosa*, only larger.

Culture &c. as above. This plant is seen to its best advantage in bold groups in open places.

Tribe V. HELIANTHOIDEÆ.—Leaves often opposite, rarely all alternate, entire, toothed, or variously cut. Disc florets usually yellow, rarely white, purplish or violet. Bracts of the involucre herbaceous, rarely dry and membranous.

SILPHIUM (ROSIN PLANT). — This genus includes 11 species of tall coarse perennial herbs with copious resinous juice. Leaves alternate, opposite, or whorled, entire, toothed or lobed. Flower-heads large, yellow, monœcious, in corymbose panicles. Ray florets female, disc florets sterile. Involucre broad and flattish, with bracts in many rows. Achenes smooth, flat, longitudinally winged; wings sometimes toothed or notched at the top.

Culture and Propagation. — These plants grow in any rough soil and are suitable for rough places in the garden in bold masses. They may be increased by division early in autumn or in spring. Seeds may also be sown when ripe in cold frames, and the seedlings transplanted to the open ground the following May, having been pricked out or thinned out at least once after germination. Seedling plants sometimes take 2 or 3 years to arrive at a really good blooming condition. Increase by dividing the roots is therefore to be preferred. All natives of N. America (United States).

S. laciniatum (*Compass Plant; Pilot Weed; Polar Plant*).—A vigorous perennial with stout stems 8 ft. or more high. Leaves pinnately parted, usually stalked and clasping at the base; segments lance-shaped, acute, cut-lobed or pinnatifid, rarely entire. Flowers in July, 1–2 in. across, yellow, forming racemose spikes.

The leaves of this plant are said to turn their faces due north and south on the open prairies—hence the popular names.

Culture &c. as above.

S. perfoliatum (*Cup Plant*). — A square-stemmed plant 4–8 ft. high, with entire ovate leaves 6–15 in. long, coarsely toothed, the upper ones united by their bases, forming a cup-like disc which holds a good deal of water when it rains; lower ones abruptly narrowed into winged stalks, connate at the base. Flowers in July, yellow, about 2 in. across.

Culture &c. as above.

S. terebinthinaceum (*Prairie Dock*). A smooth-stemmed species 4–10 ft. high, with ovate oblong, somewhat heart-shaped, toothed leaves, 1–2 ft. long, on slender stalks. Flowers from July to September, small, yellow. The variety *pinnatifidum* has deeply cut leaves.

Culture &c. as above.

S. trifoliatum. — This grows 4–6 ft. high, with rather smooth slender stems. Upper leaves lance-shaped, pointed, entire or slightly toothed, short-stalked, 3–4 in a whorl, or the highest opposite. Flowers in August, yellow, in loose panicles.

Culture &c. as above.

CHRYSOGONUM.—A small genus of herbs or shrubs with opposite, entire, toothed, or pinnately cut leaves, and yellow flower-heads.

C. virginianum.—A pretty N. American perennial 6–9 in. high, with ovate coarsely toothed leaves 1½–3 in. long, and yellow flower-heads in June, each one surrounded by 5 deep golden-yellow bracts of the involucre.

Culture and Propagation.—This is the only species out of half a dozen known in gardens. It looks well in bold masses in the rock garden or border, and flourishes in well-drained peat and loam in partially shaded and sheltered spots. It may be easily increased by dividing the tufts in spring as growth is commencing.

ZINNIA.—A genus containing about 12 species of annual or perennial herbs or sub-shrubs, with opposite or verticillate, sessile or stem-clasping entire leaves. Flower-heads solitary, stalked, at the tips or forks of the branches. Involucre bell-shaped, or somewhat cylindrical; bracts in 3 or more rows; receptacle conical or cylindrical. Ray florets strap-shaped; disc florets tubular, shortly 5-cleft. Achenes narrow, striped, smooth or hairy at the angles.

Culture and Propagation.—Zinnias when well grown are charming plants for the flower garden, in groups by themselves or massed with other plants. They like a rich loamy soil and sunny situations. Being mostly annuals they must be raised from seeds every year. About the middle of March is the best time to sow in gentle heat. It is a mistake to sow too early, as the plants become too weak and lanky before the planting-out time in June arrives. The seedlings should be pricked off when large enough to handle, and should be gradually hardened off in cooler and lightsome places. Both single and double varieties are worth growing, although the latter are somewhat dwarfer and more compact in habit.

The Zinnias are all natives of America—chiefly Mexico.

Z. elegans.—A hairy-stemmed annual 1½–2 ft. high, with heart-shaped, ovate, stem-clasping leaves, and flowers varying in colour from scarlet to crimson, rose, buff, or white.

From this species most of the garden Zinnias have been evolved by careful selection and hybridisation, and they possess some very fine colours, such as blood-red, orange-scarlet, rosy-carmine, deep yellow, vermilion &c. Among the named varieties may be mentioned: *coccinea*, scarlet; *Darwini*, with very double flowers; *flore pleno*, *violacea*, *gloriosa*. There are also miniature Pompon varieties about 6 in. high, suitable for edgings &c.

Culture &c. as above.

Z. haageana. — Similar in habit to *Z. elegans*, but with brilliant orange or yellow flower-heads. *Flore pleno* is a fine double-flowered variety; and *pumila flore pleno* is a dwarf kind about 6 in. high, with elegant double golden-yellow flowers striped with orange.

Other varieties known as *grandiflora* and *zebrina* are choice garden forms, the latter having beautifully striped double flowers. Many other names will be found in catalogues, but a packet of good mixed seed will give all the colours desired. Other names for *Z. haageana* are *Z. mexicana* and *Z. aurea.*

Culture &c. as above.

Z. multiflora (*Z. verticillata*). — A bushy and rather hairy Mexican annual 1½–2 ft. high, with oval or oblong lance-shaped leaves. Flower-heads small, with deep red obovate rosy florets in the type. There is however a form with yellow florets.

Culture &c. as above. This species is not of great garden value, and with it may be classed *Z. pauciflora*, also a Mexican annual, with yellow flower-heads, having a deep dull red centre.

SANVITALIA.—A genus with a few species of annual or perennial herbs, having opposite entire leaves, and yellow or whitish flower-heads. Bracts of the involucre in 2–3 series. Receptacle flat or convex. Achenes smooth, those of the disc crowned with a pappus of 3 bristles.

S. procumbens.—A pretty Mexican annual with trailing branches and ovate entire leaves. Flowers in summer, like those of a small *Rudbeckia*, bright yellow, with a dark purplish disc. The double-flowered variety *flore pleno* is showier than the type, with wholly yellow flowers.

Culture and Propagation.—This is the only species in cultivation. Owing to its dwarf compact growth it looks well in masses at the edges of borders, or trailing over the sides of baskets. It thrives in sandy loam and peat, and seeds may be sown in autumn for spring flowering, or in March and April for late summer flowering. For the general treatment of annuals see p. 78.

HELIOPSIS.—A genus containing a few species of rather pretty annuals and perennials, with usually opposite stalked leaves (upper ones rarely alternate) and large yellow flower-heads. The annuals are rarely seen, and the perennials may be grown and increased as in the case of the perennial Sunflowers.

H. canescens (*Helianthus cordatus*). A bushy Peruvian annual 2–3 ft. high, with downy stems, and grey-green opposite heart-shaped acute leaves with coarsely toothed margins. The yellow flower-heads, with a conical disc in the centre, appear from July to September, and are borne singly at the end of a long downy or hairy stalk which gradually becomes swollen towards the flower-head.

Culture and Propagation.—Being an annual this species may be treated as recommended for annuals in general at p. 73. The seeds should be sown in gentle heat in March, afterwards pricking the seedlings out, and by the end of May they will be fit for the open border. The plants may be placed 12–15 in. apart or more, and if grown in groups look very effective.

H. lævis. — A pretty free-growing perennial 3–6 ft. high, with ovate lance-shaped, coarsely toothed leaves, and flowers about 3 in. across in autumn on long stalks. The varieties *scabra* and *scabra major* are both improvements on the type, having larger and more numerous flowers. Native of N. America.

Culture and Propagation. — This species flourishes in ordinary good garden soil, but is well worth treating well. It makes a fine show in the herbaceous border if grown in fairly large clumps. Seeds are ripened freely, but it is much easier, and on the whole preferable, to increase the plants by dividing the roots in autumn or in spring, the latter season being generally regarded as best. The seeds may be sown in cold frames when ripe, or in spring, in light rich soil, and by the following autumn or spring, according to the period of sowing the seeds, the young plants may be transferred to the open ground about 15–18 in. apart.

GYMNOLOMIA (GYMNOPSIS). — A genus having about 16 species of erect branching more or less roughish hairy plants, with the lower leaves nearly all opposite, the upper ones nearly all alternate, entire, toothed, or lobed. Flower heads solitary or in loose clusters, yellow, or sometimes purple. Receptacle convex or conical. Ray florets spreading, entire, or slightly toothed at apex.

G. uniserialis.—A pretty Texan annual 1½-3 ft. high, with roughish hairy stems, and ovate elliptic coarsely toothed leaves reminding one of *Helianthus cucumerifolius*. The solitary flower-heads appear at the ends of the shoots from June to September, and are 2–3 in. across, having 5 broadly elliptic ray florets of a pretty chrome yellow, surrounding a conical cluster of disc florets.

Culture and Propagation.—This recently introduced plant is ornamental grown in patches in the flower border, and will flourish in ordinary garden soil in sunny positions. It is raised from seeds sown in gentle heat in spring and planted out at the end of May, or seeds may be sown in the open border in April. It requires a little attention when young, as it is inclined to be 'miffy' or delicate until established. The flowers are excellent for cutting and last a long time.

MONTANOA.—A genus with over a dozen species of shrubs with opposite, entire, toothed or broadly-lobed leaves; lower ones often large and pinnately cut. Flower heads white or pink, in corymbose panicles. Ray florets sterile. Achenes smooth; the hypogynous disc sometimes much developed to resemble a cup-shaped pappus.

Culture and Propagation. — Montanoas are natives of Mexico, and are too tender even for the mildest parts of the British Islands, except during the summer months, when they are brought from the conservatory to lend an air of sub-tropical luxuriance to the garden. Seeds are sown in gentle bottom heat about March, and the seedlings are pricked out and gradually hardened off so as to be fit for planting out in June. In autumn the old plants may be taken into the greenhouse for winter. In January, if placed in heat, young shoots will spring from the roots, and may be used as cuttings in the same way as mentioned under Dahlia (p. 519). They will root in gentle heat in a close frame, and if afterwards potted up and grown on with plenty of light and air when established they make fine plants. The chief attraction of Montanoas consists in the large and attractively divided leaves, and not in the flower-heads.

M. bipinnatifida (*M. heracleifolia; Polymnia grandis*). — A striking plant 6–8 ft. high, with large opposite twice pinnately cut leaves with serrated segments, somewhat resembling those of *Heracleum* (p. 469). The stem and leaf-stalks are spotted with white, and the leaves when young are clothed with a soft whitish down. Flower-heads yellow.

Culture &c. as above.

M. mollissima.—An ornamental shrub with oval lance-shaped, sessile leaves, dull green above, silvery white and hairy beneath. Flowers from August to October, white with a yellow centre.

Culture &c. as above.

M. tomentosa.—A shrub about 3 ft. high, with heart-shaped oblong-toothed woolly leaves, and white flowers in September in compound corymbs.

Culture &c. as above.

RUDBECKIA (Cone Flower).—A genus containing about 25 species of N. American perennials with alternate or rarely opposite, entire, toothed, incised, or pinnatisect leaves. Flower-heads solitary or few, on long stalks; involucre hemispherical, the bracts in 2, 3, or 4 series; receptacle much elevated, cone-like or columnar; ray florets strap-shaped, spreading, often elongated, entire, or with 2–3 short teeth at the apex.

Culture and Propagation.—Rudbeckias grow well in ordinary garden soil, but the richer it is the better. Grown in masses the most showy kinds like *R. speciosa* and *R. maxima* are very fine. They may be increased by dividing the roots after flowering or in early spring. Also by seeds sown as soon as ripe in cold frames, or in gentle heat in spring, afterwards pricking the seedlings out and growing on until about the middle or end of May, when they may be planted in the open border. Seeds may also be sown out of doors in April and May, and the plants may be thinned out afterwards. The annual species of course can only be raised from seeds sown as above directed.

R. amplexicaulis (*Dracopis amplexicaulis*).—A bushy Mexican annual 1½–3 ft. high, with oval oblong stem-clasping leaves of a rather blue-green tint. The flower-heads are borne in great abundance during the summer and autumn months and consist of 6–8 ray florets surrounding a purple conical or cylindrical disc, which increases in length with age.

Culture &c. as above. Increased by seeds sown when ripe in cold frames; in spring in gentle heat, and in the open border in April and May.

R. bicolor.—This is a dwarf branching annual with bright yellow flowers and blackish-purple conical disc, borne from July to September. It requires to be sown in slight heat in February or March, and planted out in May or June.

Culture &c. as above. Increased by seed.

R. californica.—A vigorous Californian perennial 5–6 ft. high, with oval pointed roughish leaves, having an occasional lobe or tooth, the lower ones about 1 ft. long and 6 in. broad, narrowed into a stalk. Flowers in summer, golden-yellow, about 5 in. across, with a dark brown conical disc 2 in. or more high.

Culture &c. as above. Grows well in shade.

R. columnaris (*Lepachys columnaris*). A pretty N. American perennial 2–3 ft. high, with leaves pinnately cut into sharp-pointed linear lance-shaped segments. Flower-heads with broadly oblong elliptic drooping ray florets of a citron or orange-yellow colour, and a purplish cylindrical disc in the centre.

Culture &c. as above.

R. Drummondi.—A very handsome greyish-green downy plant, 1½–2 ft. high, native of Mexico. Leaves alternate, pinnate, with linear toothed segments; lower ones not so deeply cut. Flowers from June to September, yellow, with a large velvety blotch of purple-brown, and a brownish conical disc about 1 in. high. This species is sometimes called *Obeliscaria pulcherrima.* Although a perennial it is not quite hardy in northern parts, and in such localities is best raised from seeds annually as above directed.

Culture &c. as above.

R. fulgida (*R. chrysomela*).—A hairy species 2–3 ft. high, with oblong spoon-shaped or lance-shaped, stem-clasping 3-nerved leaves, lower ones toothed, upper entire. Flowers late in summer, 2–3 in. across, orange-yellow, with a dark purple conical disc.

Culture &c. as above.

R. grandiflora. — A pretty angular-stemmed species 3–4 ft. high. Lower leaves ovate crenate toothed; upper ones lance-shaped, roughish, obscurely crenate, all stalked. Flowers in September, 3–4 in. across, with a raised dark purple disc. Native of America.

Culture &c. as above.

R. hirta.—A very rough and bristly hairy plant 1–2 ft. high. Lower leaves spoon-shaped 3-nerved; upper ones oblong or lance-shaped, all sessile. Flowers from June to August 3–4 in. across, yellow, with a dark purple-brown disc.

Culture &c. as above. Will grow in shade.

R. laciniata.—A showy perennial 2-4 ft. high, the main stem sometimes reaching a height of 15 ft. and always needing support. Leaves roughish, deeply parted and cut, and clothed with small hairs, especially at the edges. Flowers in summer, clear yellow, 3-4 in. across, with a greenish-yellow conical disc. The variety *flore pleno* grows 6 ft. high, and has handsome double orange-yellow flowers.

Culture &c. as above.

R. maxima. — A fine species 4-8 ft. high, with oval or oblong, slightly toothed or entire glaucous leaves, stem-clasping above, stalked below, 8-12 in. long. Flowers in August, 3-4 in. across, yellow, with a cone-like disc; ray florets drooping.

Culture &c. as above.

R. pallida (*Echinacea angustifolia*). A pretty perennial 2-4 ft. high, with lance-shaped hairy leaves 4-6 in. long. Flowers in summer, 4-6 in. across, pale purple or rose.

Culture &c. as above.

R. pinnata (*Lepachys pinnatifida*).—A pretty plant about 3 ft. high, with pinnate leaves cut into 3-7 lance-shaped acute leaflets. Flowers in July, with light yellow drooping ray florets longer than the cylindrical disc.

Culture &c. as above.

R. purpurea (*Echinacea purpurea*).—A showy species 3-4 ft. high, with smooth stems, and roughish ovate lance-shaped leaves, tapering towards the base. Flowers in late summer and autumn, about 4 in. across, rosy-purple, solitary, on long, thick, rigid stalks. The variety *intermedia* has less drooping ray florets; and *serotina* is a later flowering hairy form. Native of Louisiana.

Culture &c. as above.

R. speciosa (*R. Newmani*).—A handsome compact-growing species 2-3 ft. high. Lower leaves ovate, strongly ribbed, coarsely toothed, on slender stalks, 6-9 in. long; upper ones sessile lance-shaped. Flowers late in summer, 3-4 in. across, rich orange-yellow, with a velvety blackish-purple globose disc and drooping ray florets. Native of N. America.

Culture &c. as above.

R. triloba.—A vigorous hairy plant, 3-5 ft. high, with lower leaves 3-lobed and coarsely serrate; upper ones ovate lance-shaped, sessile; those springing from the root having slender stalks. Flowers in August, numerous, 2-3 in. across, yellow, with a deep brown or blackish-purple disc. Native of Carolina.

Culture &c. as above.

HELIANTHUS (SUNFLOWER).—This genus (which now includes *Harpalium*) consists of about 50 species of tall annual or perennial herbs, mostly natives of N. America. Leaves large, simple, roughish. Flower-heads large, yellow; ray florets yellow; disc florets purple or violet.

Culture and Propagation. — All the Sunflowers are easily grown in ordinary garden soil, but the richer it is the better, as they are gross feeders. The annual kinds are easily raised from seeds sown in the open border. The perennial kinds are increased in autumn or spring by dividing the rootstocks, every shoot of which will produce a new plant. They like plenty of room to develop and an open sunny situation. In the late summer and autumn—from the beginning of August onwards—the perennial Sunflowers are very effective in masses by themselves either in borders or on the grass. If given plenty of space the stems will be strong enough to support themselves, but if too close together will become weak, straggling, and untidy unless neatly tied to stout stakes. Although the perennial Sunflowers grow well in our climate it is very rarely that any of them ripens seeds.

H. angustifolius (*Coreopsis angustifolia; Rudbeckia angustifolia*).—A native of wet places from New Jersey and Kentucky to Florida and Texas, 2-5 ft. high, with slender stems, and dark green narrow glossy leaves. Flowers in September and October, orange-yellow, over 2 in. across, with a blackish-purple centre.

Culture &c. as above. Increased by division.

H. annuus (*Common Sunflower*).—A well-known plant with stout stems 6-10 ft. high, and large heart-shaped, coarsely toothed leaves, the yellow flowers varying from 6 to 12 in. across. The common single variety is not worthy of cultivation in the flower garden, but some of the better kinds as *globosus*, *fistulosus*, *cucumerifolius*, *sulphureus*, *Dammani*, *californicus plenissimus* are more or less ornamental. *H. argophyllus* seems to be a form of the Common Sunflower, with soft silvery downy leaves, but it rarely attains a height of 6 ft. *H. lenticularis* is another variety about the same height.

Culture &c. as above. Raised from

seeds sown in the open border in April and May, or in slight heat in March, afterwards pricking the seedlings out, and transplanting in May.

H. decapetalus. — A pretty species, 4–6 ft. high, native of the banks of streams &c., from Canada to Georgia. Lower leaves rather ovate, pointed, about 6 in. long, the upper ones shorter, all somewhat obscurely toothed. Flowers 2–3 in. across, rich sulphur-yellow, with 12–14 ray florets.

Culture &c. as above. Increased by division.

H. divaricatus. — A native of the United States 4–6 ft. high, with green or purplish stems and ovate, pointed, stalked and opposite leaves. Flowers 2–3 in. or more across, orange-yellow.

Culture &c. as above. Increased by division.

H. doronicoides.—A native of Ohio to Missouri, 5–8 ft. high, with rough and densely downy stems. Leaves opposite (or alternate above), ovate, sessile, serrate, and tapering at both ends. Flowers late in autumn, yellow, crowded on short stalks.

Culture &c. as above. Increased by division.

H. exilis. — A slender-growing Californian annual 2–3 ft. high, with lance-shaped leaves and golden-yellow flowers about 2 in. across.

Culture &c. as above. Increased by division.

H. giganteus.—An elegant perennial, found in moist or swampy parts of Canada, Alabama, and Louisiana. Stems 10–12 ft. high, purplish, glaucous, bearing opposite lance-shaped stalked serrated leaves, the upper ones often with winged stalks. Flowers in autumn, deep yellow, 3–4 in. across, with a purplish centre.

Culture &c. as above. Increased by division.

H. grosse-serratus.—A very distinct species, native of dry places in the N. United States. Stems 6–9 ft. high, smooth and glaucous, with lance-shaped pointed, stalked leaves, coarsely toothed, deep green above, woolly beneath. Flowers late in autumn, 2–3 in. across, deep yellow.

Culture &c. as above. Increased by division.

H. lætiflorus. — A handsome species, native of Indiana, Illinois, and Wisconsin, with stiff, roughly hairy stems, 6–8 ft. high. Upper leaves opposite or alternate, entire or coarsely toothed, lower leaves 9–12 in. long, broadly ovate acuminate stalked, 3-nerved. Flowers in autumn, 4–5 in. across, bright yellow, with a deeper yellow centre.

Culture &c. as above. This is one of the few perennial Sunflowers which ripens seeds in the British Islands.

H. lævigatus.—A native of the United States, 3–5 ft. high, with deep purple, smooth, and usually glaucous stems. Leaves all opposite (or the upper sometimes alternate) sessile or nearly so, lance-shaped acute, entire or slightly toothed, 3-nerved. Flowers bright yellow, 2–3 in. across, with 6–8 ray florets.

Culture &c. as above. Increased by division.

H. Maximiliani.—A native of the N. United States 7–8 ft. high, with roughish stems, and lance-shaped, pointed entire or slightly toothed leaves. Flowers in autumn, 3–4 in. across, golden-yellow.

Culture &c. as above. Increased by division.

H. mollis. — A hoary-looking plant 3–5 ft. high, with greyish-green, densely hairy stems. Leaves mostly opposite, ovate pointed, with a lobed or clasping base, serrate, softly hoary beneath. Flowers from July to October, golden-yellow, 4–5 in. across, with a darker centre.

Culture &c. as above. Increased by division.

H. multiflorus. —A beautiful plant 3–5 ft. high, with ovate heart-shaped, toothed leaves, and numerous bright yellow flowers, 3–5 in. across, from the end of July to October. The variety *maximus* is a taller plant with larger and finer flowers; *major* is similar; *Soleil d'or* and *Bouquet d'or* have double 'quilled' flowers; and *flore pleno* is a beautiful double-flowered form rather dwarfer than the type.

Culture &c. as above. Increased by division.

H. occidentalis. — A slender hairy-stemmed species 2–3 ft. high. Lower leaves ovate, obtuse or oblong, lance-shaped, rather leathery, 3-nerved, stalked. Flowers orange-yellow, 2–3 in. across, mostly solitary on long stalks.

Culture &c. as above. Increased by division.

H. orgyalis.—A species with smooth, purplish, glaucous stems 6-10 ft. high. Leaves alternate narrow and recurved, 5-8 in. or more long, entire or slightly toothed. Flowers late in autumn, numerous, about 2 in. across, deep golden-yellow, with a purple centre.

Culture &c. as above. Increased by division.

H. petiolaris.—A rather rare annual species, native of Texas, 2–3 ft. high, with hairy stems and leaves, and yellow flowers 3–4 in. across. The variety *canescens* is covered with a hoary down.

Culture &c. as above. Increased by seeds sown in the open border in April and May, or in gentle heat in March.

H. rigidus.—A well-known but very variable species 3–5 ft. high, with roughish or hairy purplish rigid stems, and broadly lance-shaped pointed 3-nerved leaves, alternate above, opposite below. Flowers from July to September, bright yellow, about 4 in. across, with a deep or dull purplish centre.

There are several varieties of this species all superior to the ordinary form. *Æstivus*, *grandiflorus*, and *elegans* have purplish centres; *latifolius* has broad leaves and grows 6–7 ft. high. *Miss Mellish* is a very free strong-growing variety about the same height, with orange-yellow flowers 4–5 in. across, and one of the best kinds to grow for September blooming; *semiplenus* has numerous ray florets and a purplish disc.

Culture &c. as above. Increased by division.

H. scaberrimus.—A distinct Californian annual, with stout branching stems 2–3 ft. or more high, furnished with broad, oval, coarsely toothed leaves, and having large deep yellow flowers in summer.

Culture &c. as above. Increased by seeds sown in the open border in April and May, or in gentle heat in March.

ACTINOMERIS.—A small genus of perennial herbs with ovate or lance-shaped serrated leaves, and flowers in corymbose heads.

A. squarrosa (*Verbesina Coreopsis*).—A pretty N. American perennial with square, winged stems, about 3 ft. high. Leaves decurrent, broadly lance-shaped, coarsely toothed. . Flowers in July and August, yellow, 2 in. or more across. The plants known as *alternifolius* and *helianthoides* are forms of this, if not identical. There are two other species, both N. American, one *alata*, about 3 ft. high, the other *procera*, about 8 ft. high.

Culture and Propagation.—These ornamental plants grow well in loamy soil, and may be increased by dividing the roots in autumn or spring, or by seeds sown in the open border or in cold frames at the same periods.

VERBESINA (Crown Beard).—A genus containing about 50 species of more or less tender annual or perennial herbs, having opposite (or the upper alternate) leaves, stalked or sessile, toothed, lobed, or rarely entire. Flower-heads yellow, or the ray florets white, ligulate, spreading, entire or 2–3-toothed. Receptacle flat, convex or conical, with chaffy scales. Achenes flattened with two bristle-like awns.

Culture and Propagation.—These plants are sometimes used for outdoor effect, more for the appearance of the foliage than for the flowers. They thrive in rich soil, and may be raised from seeds sown in heat about March. The seedlings are pricked out into nice rich soil and gradually hardened off in cooler quarters so as to be ready for the open air about June. The perennials may be divided, or cuttings may be taken in spring, as with *Montanoas*, from the old rootstocks which have been placed in gentle heat and kept sprinkled every day. They nearly all require greenhouse shelter in winter.

V. alata.—A West Indian species, 2 ft. high, with nearly glabrous, wavy and sinuately toothed leaves, and orange-yellow flowers. It derives its specific name from the fact that the stems are winged.

Culture &c. as above.

V. encelioides.—A Mexican annual 2–3 ft. high, with ovate or oblong coarsely toothed leaves, having broadly winged stalks, lobed at the base, and yellow flowers in August.

Culture &c. as above.

V. gigantea.—A native of Jamaica, about 6½ ft. high, with beautiful large glistening green leaves with winged stalks, and yellow flowers in summer.

Culture &c. as above.

V. pinnatifida.—A bold Mexican perennial 3–4 ft. high, with broad deeply lobed leaves, somewhat hairy on both surfaces, and 4-winged woolly stems. Flowers in August, pale yellow.

Culture &c. as above.

COREOPSIS (Calliopsis). — Tick Seed.—A genus of smooth showy annual or perennial herbs, all natives of the United States. Leaves simple or pinnate, opposite. Ray florets spreading, more or less deeply toothed or notched at the apex. Bracts of the involucre in two rows, the outer spreading, the inner united at the base and erect. Receptacle with linear chaffy scales.

Culture and Propagation.—Coreopsis thrive in ordinary garden soil, and are among the showiest of summer flowers, especially when grown in masses. The annual kinds are easily raised from seeds sown in the open in April, or in slight heat early in March, afterwards pricking the seedlings out about the end of May. By sowing seeds of the annual varieties at intervals in the open border from April to the end of September a good succession of flowering plants can be obtained for six or seven months of the year. For the general treatment of hardy annuals see p. 78. The perennials may be raised in the same way or by cuttings during the summer, or by dividing the roots in autumn or spring. They are exceedingly effective grown in bold masses either in the flower border or rock garden, and their graceful flowering shoots are very valuable for cutting, as they last fresh a good time in water. The same may be said of the annual varieties.

C. aristosa.—An annual about 1–3 ft. high, with deeply pinnatifid leaves, having coarsely toothed, lance-shaped segments. Flowers in summer, orange-yellow, over 2 in. across, in terminal panicles.

Culture &c. as above recommended for the annual varieties.

C. atkinsoniana.—A graceful annual 2–4 ft. high, closely related to *C. Drummondi*, but with leaves cut into numerous linear lobes. The flowers are 1½–2 in. across, bright yellow, with a conspicuous reddish-purple blotch at the base of each ray floret.

Culture &c. as above recommended for the annual species.

C. aurea.—A smooth biennial 1–3 ft. high, with 3–7-parted leaves having lance-shaped segments. Flowers in autumn about 2½ in. across, golden-yellow, with a dull yellow centre.

Culture &c. as above recommended for the annual species. Increased by sowing seeds at intervals from April to September in the open border.

C. auriculata.—A beautiful perennial 1½–2 ft. high, with entire or occasionally 3-lobed leaves. Flowers in summer on long stalks, usually solitary, yellow, with a band of purple-brown at the base of the ray florets.

Culture &c. as above.

C. cardaminifolia.—A beautiful dense-growing annual 1–2 ft. high with more or less deeply divided leaves, the lobes of the lower ones being oval or lance-shaped, and often very narrow and linear. The flowers appear in summer and autumn; they are of a pleasing soft yellow colour, and 1–2 in. across.

Culture &c. as above for *C. aurea.*

C. coronata. — A handsome annual about 2 ft. high, with opposite spoon-shaped leaves tapering at the base, entire or pinnately cut. Flowers in summer, orange, spotted with brownish-purple at the base, and 2–3 in. across.

Culture &c. as above.

C. Drummondi (*C. diversifolia*).—A beautiful annual 12–18 in. high, with pinnate leaves divided into ovate or lance-shaped lobes. Flowers in summer, bright yellow, 2 in. or more across, with a band of rich crimson-brown around the disc.

Culture &c. as above recommended for the annual species. This is one of the best known kinds and is a great favourite with cottagers in many parts of the kingdom.

C. grandiflora. — A splendid showy perennial 3 ft. high, the best of all. Leaves almost sessile, bearded at the base. Flowers bright self-yellow, 2–3 in. across, all through the summer months. Ray florets 5-toothed, deeply cut.

Culture &c. as above. A splendid plant for cutting.

C. japonica.—This is the only species of Coreopsis yet introduced from Japan, and is at present scarcely known. It has linear lance-shaped leaves, and heads of soft bright yellow flowers produced during the summer and autumn months.

Culture &c. as above.

C. lanceolata.—A fine perennial 1–3 ft. high, with entire bearded lance-shaped leaves, upper ones slightly connate at the base. Flowers bright yellow, 2-3 in. across; ray florets 4-toothed.

Culture &c. as above. A splendid plant for cutting.

C. **nudata**.—A distinct-looking herbaceous perennial with Rush-like leaves. The flower-heads somewhat resemble those of a single Dahlia; they are 2½-3 in. across, purple in colour with a conspicuous yellow disc.

Culture &c. as above for the perennial kinds.

C. **tinctoria** (*C. bicolor*).—A pretty slender-growing annual, 1½-2 ft. high. Leaves pinnate with linear segments. Flowers bright yellow with a purple-brown blotch at the base of the jagged-toothed ray florets. There are several varieties, but *nana*, a dwarf-growing one, *atrosanguinea* with deep purplish flowers, and *nigra speciosa*, a dark brown self-coloured form, are perhaps best known.

Culture &c. as above recommended for the annual species. *C. tinctoria* and its varieties are even more popular than *C. Drummondi*.

C. **verticillata** (*C. tenuifolia*).—A pretty perennial with furrowed stems 1-2 ft. high, and leaves much divided into linear whorled segments. Flowers bright golden-yellow, about 1½ in. across.

Culture &c. as above for the perennial species.

LEPTOSYNE.—A genus closely related to *Coreopsis* and containing about 7 species of annual or perennial herbs or shrubs, with pinnately divided or dissected leaves, and showy heads of bright yellow flowers. They have the habit of Coreopsis but differ in having the ray florets pistillate (or female), and always with a ring of hairs on the tube or throat of the disc flowers.

Culture and Propagation.—This is practically the same as for *Coreopsis*, but they are more tender. The plants flourish in ordinary good garden soil, and look very effective grown in masses. They may be raised from seeds sown in the open border in April or in gentle heat in March, and the seedlings transplanted in May or June. The perennials may also be increased from seeds in the same way, as they are too tender to stand our winters.

L. **callipsoidea**.—A pretty Californian annual 1-2 ft. high, with narrow linear lobed or incised leaves. Flowers in autumn, yellow, rather large, on long stalks.

Culture &c. as above. This species is also known in gardens as *L. maritima*, but it is quite distinct from the true plant of that name. Its flowers very much resemble those of a Coreopsis and are usually composed of 8 oblong wedge-shaped bluntly toothed ray florets surrounding the small disc.

L. **Douglasi** is a half-hardy annual about 1 ft. high with finely divided leaves and yellow flower-heads.

Culture &c. as above.

L. **gigantea**.—A vigorous-growing Californian annual with soft-wooded stems 2-8 ft. high, furnished with finely divided leaves. The yellow flower-heads appear in summer and autumn, and very much resemble those of a small Sunflower.

Culture &c. as above.

L. **maritima** (*Coreopsis maritima*).—A somewhat tender American perennial, 6-12 in. high, with leaves twice pinnately divided into narrow linear lobes. Flowers in autumn, yellow, 2-3 in. across, with 16-20 oblong ray florets surrounding a much deeper orange-yellow disc.

Culture &c. as above. Although a true perennial, *L. maritima* is rather too tender to stand our winters except perhaps in the very mildest parts. It is, therefore, best as a rule to treat it as a half-hardy annual, and raise the plants from seeds sown in gentle heat every spring, or in cold frames in autumn.

L. **Stillmani**.—A recently introduced Californian annual resembling *L. Douglasi*. It has graceful thinly cut foliage and grows about 1 ft. high, forming a compact bushy plant. Flowers golden-yellow, about 1½ in. across, borne at the tips of almost every shoot in summer.

Culture &c. as above. It is best to sow this species in the open border in sandy soil and sunny situations. It will often bloom four or five weeks afterwards.

DAHLIA.—A genus of beautiful and popular herbaceous plants distinguished botanically by having a double involucre, no pappus, and a large scarious bracteole at the base of each floret. The leaves are opposite, and once, twice, or thrice pinnately parted. Flower-heads large and borne on long stalks.

There are only about half a dozen

wild species, all natives of Mexico, and the first plant was introduced just over 100 years ago—in 1789—by the Marchioness of Bute. Owing to the ease with which it has been induced by cultivation to produce double flowers, the Dahlia has since that period undergone vast changes at the hands of the gardener, and there are now many varieties which may be roughly classified as follows:—

1. *Single Dahlias.*—These are the outcome of *D. coccinea* and *D. lutea*, and are recognised by having a disc of tubular florets, surrounded by the larger and more showy ray florets. For many years the single-flowered Dahlias were sadly neglected owing chiefly to the great strides that were made in raising new forms of the show, fancy, and other sections, with double flowers. Of late years, however, they have again come into favour, and it is not too much to say that in many ways they equal if they do not actually surpass the double forms in beauty and grace when well grown.

2. *Show Dahlias.*—These include all self-coloured double flowers, and all shaded or having the petals pale and edged with a distinct colour such as pink, purple, crimson, mauve &c.

3. *Fancy Dahlias.*—These have two or more colours, and may also have the petals striped or tipped. They are somewhat confused with the show varieties.

4. *Cactus or Decorative Dahlias.* These have arisen from *D. Juarezi*, which was not introduced until about 1872, and was first exhibited in London in September 1879, but attracted little attention. Since then, however, it has developed some of the finest Dahlias in cultivation —recognised by the more or less pointed starry, double flowers. What are known as 'Single' Cactus Dahlias have been produced of recent years.

5. *Bedding, Bouquet,* or *Pompon Dahlias.*—A section with small beautifully symmetrical double flowers. The plants are more dwarf and compact in growth than those of the other sections.

6. *Tom Thumb Dahlias.*—This is a very dwarf race, stunted in growth and not quite so free-flowering as the other sections.

The garden Dahlia on the whole seems to have been evolved by continually crossing and intercrossing the best forms of *D. coccinea, D. Mercki* and *D. variabilis*, and there is nothing to prevent still further complications with the progress of time.

It would be useless to burden these pages with lists of the varieties in each class, for the simple reason that many, if not most of them, would be quite unknown in twelve months time. Suffice it to say that between 600 and 800 varieties have been considered distinct enough for naming, so far, and each year several new ones are added. In obtaining a collection, the best plan is to consult a good grower as to the best kinds required for any particular purpose, and in any special shade of colour. The catalogues published annually will be of great assistance. Always select plants that throw the flowers well above the foliage and do not hang their heads. When making a selection of Dahlias it is always the best plan to examine the varieties as they are naturally grown. It will then be easy to see those of vigorous habit and freedom of flowering. When seen at exhibitions the blossoms are naturally displayed to the best advantage to attract attention, and the most floppy flowers can be made to stand as erect as their more vigorous brethren.

Culture.—Dahlias like a rather rich, heavy loam, which should have been well manured and dug some time previous to planting. Except in the southern parts of England and Ireland perhaps, it is hardly safe to put the plants out until about the first or second week in June, according to locality and the season. The plants should not be nearer to each other than 4 or 5 feet. It looks a terrible waste of ground at first, but the growth of a month or two will show that in some cases at least it is barely sufficient.

Each plant should have a strong stout stake about 6 ft. high or more put to it when planted, thus avoiding injury to the roots later on.

With the advance of time, the strong shoots should be securely tied to the stake, and all weak growths removed, so as to give greater vigour to the remaining shoots and blossoms. During summer plenty of water should be given to the roots, and a good mulching of manure will tend to produce larger, finer, and clearer coloured blooms.

Position.—An aspect facing south or west is suitable, and if the beds can be protected from rough winds by hedges of other plants, so much the better.

Storing.—By October or as soon as the stems have been killed down by frosts, the tuberous roots should be dug up carefully, leaving about 6 in. of the old stems. The soil should be shaken away, the plants carefully labelled if it is desired to keep the varieties distinct, and then stored away in a dry cool airy place where they will be free from frost during the winter. They should be overhauled occasionally and any rotten portions cut away.

Propagation.—Dahlias are increased by dividing the tuberous roots, by cuttings, and by seeds. The latter are produced freely by the single varieties and may be sown in gentle heat about March. The seedlings may be put singly into small pots and grown on till June, when they may be transferred to the open border where they are intended to bloom. New varieties may be obtained in this way, but as with many other florists' flowers the great majority will not be an improvement on existing varieties.

Where novelties are not required, the plants may be quickly increased by cuttings as follows:—

The tubers are taken from their storage quarters and placed in a heat of 60°-70° Fahr., about February or March, slightly covered with soil, and gently syringed every day. Stout, sturdy shoots are soon produced, and each one of these may be detached with a sharp knife and inserted in a small pot with sandy soil. It will root in a few days, and may be gradually hardened off and grown on until planting-out time. Where cuttings are in abundance it will save time to put several of them into a shallow box or pan. In summer time the young side shoots will also root freely if treated in the same way.

In very rare cases Dahlias are grafted in winter, but probably more as an experiment than anything else. A shoot, taken from a plant grown in a greenhouse, is inserted into a slit made in a healthy tuber, and the stock and graft are firmly secured and covered with clay or wax. The whole is then potted up and kept in a close frame with a just sufficiently high temperature, 60°-70° Fahr., to assist the action of the sap. When the union is complete the plant may be given more light and air, and in the spring time cuttings may be secured from it and rooted as above described.

Insect Pests.—Wherever Dahlias grow earwigs are almost surely found. These insects are very mischievous. They eat out the young shoots, and also destroy the florets among which they nestle. Small pots with a little hay or moss are usually placed bottom upwards on the top of the stakes. The earwigs nest in these, and if examined frequently many may be caught and shaken into a bucket of boiling water. Hollow Hemlock, Broad Bean, or Elder stems closed at one end have also been suggested as good earwig traps.

The following is a list of the natural species of Dahlia. They are all natives of Mexico.

D. coccinea (*D. bidentifolia; Georgina Cervantesi*).—A plant 3-4 ft. high, with roughish pinnate leaves. Flowers in autumn, ray florets scarlet, disc yellow; outer bracts of involucre 5, reflexed.

Culture &c. as above. Seeds are ripened freely in our climate.

D. gracilis.—Grows 4-5 ft. high, distinct and graceful in habit, with smooth twice pinnate leaves, having ovate coarsely crenate leaflets. Flowers in summer and autumn, brilliant orange-scarlet.

Culture &c. as above. Seeds are ripened freely in our climate.

D. imperialis.—A remarkable plant 10-12 ft. high. It rarely flowers in the open air, but its large and beautiful leaves make it a desirable plant for the summer. It must be removed to a greenhouse by the end of September or October for flowering. Flowers white tinged with lilac, and streaked with blood-red at the base, drooping, bell-shaped, in large panicles.

Culture &c. as above. Seeds are ripened freely in our climate.

D. Juarezi.—A fine Dahlia about 3 ft. high, with brilliant scarlet overlapping florets, varying in length. See paragraph above on Cactus or Decorative Dahlias.

Culture &c. as above. Seeds are ripened freely in our climate.

D. Mercki (*D. glabrata*).—A beautiful plant 2-4 ft. high, with 3-lobed toothed leaves. Flowers in October, white and yellow or lilac and yellow, rather small. The variety *decaisneana* has pinnate leaves and purple flowers with a golden centre.

Culture &c. as above. Ripens seeds freely.

D. variabilis (*D. crocata; D. super-*

flua).—This is probably the plant first introduced. The typical species has scarlet or red ray florets and a yellow disc; but there is great variation in the colour, and this character seems to have descended in a remarkable degree to the garden Dahlia in which almost every shade except blue is to be found.

Culture &c. as above.

D. Zimapani (*Cosmos diversifolius*). *Black Dahlia.* — A tuberous-rooted Mexican perennial, 12-18 in. high, with a compact bushy habit, and deep green leaves, cut into 5-7 ovate entire or slightly toothed lobes. The deep violet or almost blackish-purple flowers appear from July to October, and are borne singly on long stalks, well above the foliage. The variety *atropurpurea* is much deeper in colour than the type.

Culture &c. as above.

THELESPERMA.—A small genus of smooth herbs or shrubs with opposite leaves (or the upper ones alternate), linear, thread-like, and once or twice pinnately parted.

T. filifolium. — A pretty bushy plant about 2 ft. high, native of Texas, with bright green finely divided leaves, and large orange-yellow flower-heads produced in summer, with a conspicuous purple-brown blotch at the base of the broadly obovate ray florets. The plant known as *Cosmidium burridgeanum* is a hybrid between this species and *Coreopsis tinctoria*, and is intermediate between the two species.

Culture and Propagation. — These annuals flourish in light sandy soil, and may be raised from seeds sown in gentle heat in March or in the open border in April as recommended for *Cosmos bipinnatus* below. Seeds may also be sown in cold frames in autumn, and the seedlings transferred to the open border the following spring, when danger from frost is past.

COSMOS.—Annuals and perennials with pinnate leaves and solitary flower-heads. Receptacle with linear acute coloured bracteoles as long as or longer than the florets. Achenes angular, crowned with 3-4 rigid bristles.

Culture and Propagation. — These plants are easily raised from seeds sown in gentle heat in early spring, and pricked out and treated like other tender annuals, as described at p. 78 of this work. The roots of the perennials must be protected in winter, and in spring the young shoots can be taken off as cuttings. As, however, these are rarely to be met with in cultivation, even in botanic gardens, the genus is practically at present confined to *C. bipinnatus.* A rich moist and sandy soil and warm positions suit the plants best. To keep up a succession seeds may also be sown in the open border in April, but they will rarely produce flowers save in exceptionally favourable seasons.

C. bipinnatus.—A beautiful Mexican annual about 3 ft. or more high, with finely cut pinnate leaves. Flowers late in summer, bright rose or purple, 2½-3 in. across, with a yellow centre, and borne on rather short axillary and terminal stalks.

Culture &c. as above. This species is not remarkable for its free flowering, but owing to its graceful and finely divided leaves it looks very ornamental when grown in bold masses in the flower border.

BIDENS (BUR MARIGOLD).—A rather large genus of annual or perennial, sometimes climbing, smooth or hairy plants with opposite leaves, toothed, incised, or once, twice, or thrice ternately or pinnately dissected. Flower-heads with white or yellow spreading strap-shaped ray-florets entire or slightly toothed. Involucre bell-shaped or hemispherical. Receptacle flat, or slightly convex.

B. Warscewiczi. — An elegant bushy Mexican species about 18 in. high, with leaves much cut into linear segments. The flower-heads which appear from July to October very much resemble those of a *Coreopsis*; they are bright orange-yellow, and have obovate strap-shaped ray florets surrounding a yellow disc.

Culture and Propagation.—Although about 100 species have been described there are very few plants belonging to this genus of sufficient value to merit a place in the flower garden. The species described above, although really a perennial in its native country, is best treated as an annual in our climate. It will flourish in ordinary good and well-drained garden soil, and when grown in masses looks very effective. Seeds may be sown in autumn in cold frames, and the seedlings protected under glass until May; or they may be sown in gentle heat in March, and the seedlings transferred to the open in May.

They may also be sown out of doors in April and May, but in this case it is better to thin the seedlings out rather than transplant them.

TRIDAX.—A small genus of hairy or smoothish annuals or perennials having opposite leaves, lobed or cut into narrow segments. The yellow flower-heads with greenish centres are borne on long stalks. Involucre ovoid, bell-shaped, or hemispherical. Receptacle flat or convex. Ray florets 3-lobed or toothed.

T. bicolor.—A much-branched tufted annual 1-1½ ft. high, native of Northern Mexico. The lower leaves are somewhat triangular or oblong deltoid in form, and about 2 in. long; they are strongly nerved and have a few blunt teeth on the margins. The upper leaves become gradually smaller and narrower and are mostly quite entire. The flower-heads which are 1½-2 in. across appear from July to September, and are borne singly at the end of almost every shoot. In the typical plant, which does not appear to be in cultivation, the ray florets are white, but in the variety *rosea* they are rosy-lilac, rather broad, with 3 lobes or teeth, and 15-18 in number.

Culture and Propagation.—This pretty plant is best treated as a hardy or half-hardy annual (see p. 78) and may be raised from seeds sown in cold frames as soon as ripe, or in gentle heat about March, afterwards pricking the seedlings out and growing them on until mild weather in May, when they will be ready for the open air. The seeds may also be sown out of doors in patches in April and May, but it is then better to thin the seedlings out about 18-24 in. apart rather than transplant them.

T. trilobata (*Sogalgina* or *Galinsoga trilobata*).—A bushy downy annual native of Mexico. It grows about 18 in. high and has alternate oval lance-shaped 3-lobed leaves. The long-stalked golden-yellow flower-heads appear from July to September, and have wedge-shaped 5-toothed ray florets.

There is another species, *T. coronopifolia*, also a native of Mexico, and with yellow flower-heads, that is not often seen.

Culture &c. as above for *T. bicolor.*

MADIA (Madaria). — A genus of erect annual herbs, with alternate, entire or slightly toothed leaves, and yellow flower-heads, sessile or stalked at the ends of the branches.

M. elegans. — A native of N.W. America about 1-2½ ft. high, with spreading stems, and linear or lance-shaped leaves. Flowers in August, bright yellow, disc florets bearded in the limb; receptacle conical, hairy. The other species occasionally seen are *filipes*, *sativa*, and *viscosa*.

Culture and Propagation. — These plants grow in ordinary soil, and may be raised from seeds sown in early spring in gentle heat, or in the open border in April. The species described above does best in shady spots.

LAYIA.—A genus of annual or perennial downy or hairy herbs with narrow alternate entire leaves, or the lower ones rarely all pinnately divided. Flower-heads heterogamous; ray florets yellow or whitish, 2-3-toothed or cleft at the apex; disc florets yellow. Involucre broadly bell-shaped or hemispherical. Receptacle flat, or somewhat convex.

Culture and Propagation. — These plants flourish in ordinary good garden soil, especially if fairly sandy, and with plenty of manure or leaf-mould in it. They like open sunny situations and may be grown in bold masses in the mixed herbaceous border. They may be treated in the way recommended for hardy or half-hardy annuals at p. 78. The seeds may be sown when ripe in cold frames and the seedlings transplanted in spring, or they may be sown in gentle heat about March, afterwards pricking the seedlings out and hardening them off until May, when they will be sturdy enough for the outdoor garden. Seeds may also be sown in the open border in April and May, and the seedlings thinned out about 12 or 18 in. apart.

L. Calliglossa (*Oxyura chrysanthemoides*). — A pretty Californian annual 12-18 in. high, with lower leaves pinnately divided, and the upper ones entire. The yellow flower-heads 2-3 in. across, with broad oblong 3-lobed ray florets (the outer portion of which is white), appear during the summer and autumn (according to the period of sowing the seeds), and are borne singly at the ends of the shoots.

Culture &c. as above.

L. elegans. — A graceful Californian annual 12-15 in. high with stems and leaves covered with soft downy hairs, which give the plants a whitish or glaucous appearance. The leaves are linear lance-shaped, the upper ones being entire, while the lower ones are pinnately divided. The flower-heads, each about 1½ in. across, appear in summer, and have broad 3-toothed ray florets of a golden-yellow colour at the base, and white towards the apex.

Culture &c. as above.

L. **glandulosa.** — A much-branched Californian annual about 18 in. high, covered with glandular hairs throughout. The blunt linear leaves are 1–1½ in. long, and the flower-heads, which appear in summer, are about an inch across, the 3-lobed wedge-shaped ray florets being white, and the disc florets yellow.

L. heterotricha seems to be closely related to this species. It has white ray florets and a yellow disc.

Culture &c. as above.

L. **platyglossa** (*Callichroa platyglossa*). — A pretty downy Californian annual 6–12 in. high, with lower leaves stalked and in rosettes, those on the stems being alternate and sessile, but all except the uppermost lance-shaped and deeply toothed. The long-stalked flower-heads appear during the summer months and have deep yellow ray florets with 3 or 4 teeth at the apex, and arranged in a single ring round the yellow disc, which becomes brown with age.

Culture &c. as above.

Tribe VI. HELENOIDEÆ.—Leaves opposite or alternate, entire, toothed, or variously cut. Disc florets yellow, rarely white, purple, or violet. Ray florets strap-shaped, entire or 2–3-toothed. Bracts of the involucre usually in 3 series. Receptacle naked or slightly pitted.

BÆRIA.—A genus containing 4 or 5 species of smooth or hairy, often diffuse annual herbs with opposite, linear, entire, pinnately cut or divided leaves. Flower-heads yellow at the ends of the branches and long-stalked in the axils of the upper leaves. Involucre broadly bell-shaped or hemispherical. Receptacle conical, naked. Achenes linear or narrowly wedge-shaped, smooth or hairy.

Culture and Propagation. — Bærias grow readily in ordinary soil, but look effective only when grown in large patches. The individual flowers are not very large, less than 1 in. across, but they are produced in great profusion, almost entirely covering the plant. Seeds may be sown in gentle heat about March, and the seedlings planted out in June. Seeds may also be sown in patches in the open border where the plants are to bloom, but it will be necessary to thin the seedlings out so as to allow those left plenty of space to develop.

B. **chrysostoma.**—A Californian annual about 1 ft. high, with linear, opposite, entire leaves, and masses of bright yellow flowers in summer.

Culture &c. as above.

B. **coronaria** (*Hymenoxys californica; Shortia californica*).—A pretty Californian annual having trailing stems with lance-shaped acute leaves, deeply cut into linear pointed segments. Flower-heads brilliant yellow, about an inch across.

Culture &c. as above. Owing to its trailing habit this plant barely exceeds 2–3 in. in height, and looks well in masses in flower borders during the summer. It has been wrongly referred to the genus Shortia, which is described at p. 600, and belongs to a quite different family of plants.

B. **gracilis.** — A Californian annual 6–10 in. high, with opposite linear leaves, and bright yellow solitary flower-heads about ¾ in. across.

Culture &c. as above.

LASTHENIA. — A genus with only three species of smooth slender-growing annuals, having opposite linear entire leaves, and long-stalked, often nodding yellow flower-heads.

L. **glabrata** (*L. californica*). — A pretty Californian annual 9–18 in. high, with linear leaves occasionally with a tooth or lobe on each side. The bright yellow flower-heads appear during the summer months, and are borne on downy stalks.

Culture and Propagation. — This plant flourishes in ordinary garden soil, and is effective when grown in bold masses. Seeds may be sown when ripe in the open border or cold frames in autumn, and again about April so as to keep up a succession of blossom. When sown out of doors the seedlings should be thinned out and not transplanted.

BAHIA.—A genus containing about 20 species of undershrubs, bushes, or perennial more or less hoary or woolly herbs, with opposite or alternate leaves, once, twice, or thrice pinnately dissected or lobed, or the upper ones rarely nearly all entire. Flower-heads yellow, with an ovoid bell-shaped or hemispherical involucre. Receptacle flat, naked, or slightly pitted. Achenes linear or oblong, acute-angled, hairy or smooth.

B. confertiflora (*Eriophyllum confertiflorum*).—A pretty herbaceous perennial 6–18 in. high, native of California, and more or less covered with woolly hairs. The small wedge-shaped leaves are pinnately cut into 5–7 linear lobes, and the naked flower-stems are terminated by a small dense cluster of yellow starry flower-heads.

Culture and Propagation. — These plants thrive in light, sandy, well-drained loam, and are suitable for banks or borders. They are readily increased by dividing the roots in early autumn or spring, but may also be increased from seeds sown in cold frames in autumn, or in gentle heat in spring, afterwards pricking out the seedlings preparatory to transferring them to the open border.

B. lanata (*Eriophyllum cæspitosum*). A much-branched grayish N. American perennial 6–15 in. high, with usually alternate, deeply divided, or sometimes strap-shaped entire leaves. Flowers in summer, yellow, solitary, numerous.

Culture &c. as above.

PALAFOXIA.—A genus with about 6 species of erect-growing roughish downy herbs having alternate (or lower opposite) narrow entire leaves, and white, pinky or purple flower-heads in loose panicles.

P. hookeriana (*Polypteris hookeriana*). A compact-growing bushy annual, about 1 ft. high, native of the Rocky Mountains, with ovate lance-shaped leaves, and numerous carmine-rose flower-heads in loose clusters in summer.

Culture and Propagation. — This species flourishes in ordinary garden soil of a sandy nature. It likes warm sunny positions, and when grown in bold masses is very effective in the border or rock garden. Seeds should be sown in gentle heat in March and the seedlings transferred to the open air at the end of May when they have been hardened off.

P. texana (*Polypteris texana*). — A pretty annual 1–1½ ft. high, native of Texas and Mexico, with a compact bushy habit, and somewhat narrower leaves than those of *P. hookeriana.* The flower-heads are also borne in loose clusters, and are at first of a violet-rose, afterwards fading to deep pink.

Culture &c. as above for *P. hookeriana.*

HYMENATHERUM. — A small genus of annual or perennial herbs, erect or diffuse in habit, often trailing, smooth, or in one species densely woolly. Leaves opposite or alternate, pinnately dissected, or entire. Flower-heads rather small, stalked, or rarely sessile, yellow or orange. Involucre usually bell-shaped. Receptacle flat, naked, or very slightly fringed. Ray florets strap-shaped, spreading, entire.

H. tenuilobum. — A tufted and somewhat downy annual 6–12 in. high, native of Texas. Leaves alternate, pinnately cut into entire linear awl-shaped divisions. Flower-heads yellow, solitary, produced in summer and autumn.

Culture and Propagation. — This annual is scarcely ever seen in gardens. It flourishes in ordinary soil, and may be used as an edging to flower-borders and beds. The seeds may be sown in the open air in warm corners in autumn, and also in spring, afterwards pricking the seedlings out 3–4 in. apart.

TAGETES (French and African Marigold).—A genus containing about 20 species of erect or spreading annual herbs, with opposite, pinnately cut or rarely undivided and serrulate leaves. Involucre consists of about 5 bracts united into a tube. Ray florets normally 5, rarely fewer, persistent, entire or 2-lobed. Achenes linear elongated, with a pappus of 5 bristles.

Culture and Propagation. — Tagetes thrive in rich loamy soil, and look very gay in the flower border or in beds during the summer and autumn months. They may be raised from seeds in the same way as Zinnias (p. 512), and their general culture is the same. Given a rich and well-drained loamy soil Tagetes grow with great vigour and produce immense numbers of blossoms. They are raised by sowing seeds in gentle heat in February and March in shallow boxes or pans of light rich sandy soil, just covering the long black shining seeds with a little soil. They soon germinate, and when large enough to handle should be pricked out into similar boxes of light soil 2–3 in. apart, and grown on until about the end of May or beginning of June, when they will be strong and sturdy for the flower borders. The kinds described below are all natives of Mexico. Other kinds, such as *glandulifera*, *lucida*, *Parryi*, and *tenuifolia*, are occasionally seen in botanical collections, but are not generally grown.

T. erecta (*African Marigold*). — A beautiful annual about 2 ft. high, having pinnately cut leaves with lance-shaped, serrulate segments, and large heads of beautiful, soft yellow flowers, larger than those of the French Marigold. The varieties in gardens have double flowers, that is, flower-heads in which the tubular disc florets have been changed into strap-shaped ones like the ray florets, varying from pale lemon to deep orange in colour. They are very fine when grown in masses.

Culture &c. as above.

T. patula (*T. corymbosa*). — *French Marigold.*—A beautiful species about 1½ ft. high, with leaves more finely divided than those of *T. erecta.* Flowers golden-brown, or according to varieties, striped and mottled, with orange, yellow, and chestnut-brown in various shades. The variety *nana* or 'Pigmy Marigold' grows only about 6 in. high, and is a capital plant for edgings or borders.

Culture &c. as above. It is the double-flowered forms that are so much valued for their brilliancy and freedom of flowering.

T. signata (*Striped Mexican Marigold*).—An erect-growing annual about 1½ ft. high, closely allied to *T. patula*, but with much smaller golden-yellow flowers. Leaves with 6 pairs of oblong lance-shaped, deeply toothed segments. The variety *pumila* forms a dwarf compact bushy plant covered with small yellow flowers.

Culture &c. as above.

PECTIS.—A genus of about 30 species of annual or perennial herbs with opposite usually narrow and entire leaves furnished with pellucid dots. Flower-heads small, yellow. Involucre with a single row of bracts; receptacle naked. Pappus bristly or scaly.

P. angustifolia.—A branching tender annual 4–6 in. high, native of N.W. America. Leaves coarsely ciliate, linear. Flower heads yellow, fragrant.

Culture and Propagation.—This is the only species of any garden value. It may be raised from seeds sown in heat in spring, and planted out in May or June; or the seeds may be sown in the open border in April and May, afterwards thinning the young plants out about 6 in. apart.

HELENIUM.—A genus with about 18 species of pretty annual or perennial herbs, with alternate, often decurrent, entire or few-toothed leaves. Receptacle chaffy between the ray florets. Pappus of 5 bristles. Bracts of involucre in one series united at the base. Ray floret toothed.

Culture and Propagation. — These plants grow in any garden soil, and being somewhat coarse-growing require to be planted where they will not interfere with choicer things. They may be increased by dividing the roots early in autumn, or preferably in spring, or from seeds, which may be sown in spring in cold frames. The seedlings are pricked out and grown on, and if sturdy enough by the end of September may then be planted out in dull showery weather; if not, it will be better to plant the following spring. Increase by division is, however, much more easy and simple. The plants should be grown in bold masses to give a good effect, and they should be from 1 to 3 ft. apart according to height and habit.

H. autumnale. — A showy perennial 4–6 ft. high, with smooth lance-shaped, somewhat decurrent leaves 3–4 in. long. Flowers in August, pure yellow, like a small Sunflower. The varieties *grandiflorum* and *superbum* have larger and finer flowers.

Culture &c. as above.

H. Bolanderi. — A handsome Californian plant about 2½ ft. high, with lance-shaped acute leaves and large yellow flowers with a dark brown centre.

Culture &c. as above.

H. Hoopesi. — A rather showy North American perennial 2–3 ft. high, with smooth, lance-shaped, pointed, stem-clasping leaves. Flowers in early summer, bright orange, about 2 in. across.

Culture &c. as above.

H. nudiflorum (*H. grandicephalum striatum*).—A fine Texan perennial 3–4 ft. high, with lance-shaped leaves, and heads of deep orange flowers about 2 in. across, having the ray florets striped and blotched with crimson. The variety *atropurpureum* has deep purple-brown fragrant flower-heads.

Culture &c. as above.

H. pumilum. — A North American perennial 1-2 ft. high, with oblong, nearly entire leaves, and golden-yellow flowers about 2 in. across in summer.

Culture &c. as above.

H. tenuifolium. — A dense compact-growing species 12–18 in. high, the stems of which are densely furnished with sessile linear leaves about 4 in. long. The pale yellow flower-heads with a bluntly conical greenish-yellow disc in the centre appear from August to October in great profusion.

Culture &c. as above. This species, although a perennial in a wild state in Louisiana, is rather too tender in cold parts of the kingdom to be treated as such in our climate. It is best raised from seeds sown in gentle heat in spring, and transplanted in May in the same way as tender annuals in general (see p. 78).

GAILLARDIA (Blanket Flower). A genus of about 8 species of ornamental, annual, or perennial herbs, with usually simple, entire, toothed or pinnatifid leaves. Flower-heads solitary, on long naked stalks. Ray florets 3-5-toothed, often 2-coloured. Receptacle furnished with thread-like bristles between the florets; ray florets sterile.

During the summer and autumn months Gaillardias—both annual and perennial varieties—are among the gayest and showiest of flowers, and when grown in masses are literally a sheet of brilliant colour. The flowers last a long time, either on the plants, or in a cut state, and are becoming every year more used for vases &c., and room decoration.

Culture and Propagation.—Gaillardias thrive in rich loamy soil, well dug and manured before planting, but they also grow remarkably well in any ordinary soil without special attention. Slugs are sometimes to be found at the young growths in spring, and require to be looked after at that period with a little soot.

The annual Gaillardias are easily raised from seed sown in gentle heat in spring, and planted out in June, or the end of May. Seeds may also be sown in cold frames in autumn and the seedlings pricked out and grown under glass until the following spring. The perennials may also be increased by seeds, but they are usually divided at the root; they are also increased by cuttings of the young shoots in spring or autumn placed in sandy soil and sheltered in a cold frame.

In very cold wet winters the perennial kinds are likely to be killed, but a slight covering of ashes or a small heap of dry leaves will protect the crowns and drain off the water.

G. amblyodon. — An annual 2-3 ft. high, native of Texas. Lower leaves somewhat spoon-shaped, upper ones half stem-clasping, oblong, acutish, coarsely toothed towards the apex. Flowers in autumn, 2–3 in. across, with 12–14 deep blood-red obtusely 3-lobed ray florets.

Culture &c. as above. Raised from seeds sown in autumn or spring as mentioned.

G. aristata.—A perennial species about 1½ ft. high, with lance-shaped entire or remotely toothed leaves. Flowers in autumn, 1–3 in. across, yellow, the disc florets having protruding reddish styles. There are many beautiful seedling forms of this species, many of them, no doubt, the result of frequent intercrossing. *Grandiflora* and *maxima* are the finest named forms, and numerous fine variations of these have of late years been developed by Messrs. Kelway of Langport. The typical plant is a native of the United States, and is also known as *G. lanceolata* and *G. perennis.*

Culture &c. as above

G. lorenziana. — This is a German variety, with many beautiful forms raised from *G. picta*. Both ray and disc florets are more or less tubular, and form handsome flower-heads, valuable for cutting. The form *nana* is charming, being very dwarf and bushy in habit—not more than 6–8 in. high.

Culture &c. as above.

G. picta. — This is doubtless only a garden form of *G. pulchella*, with beautiful fawn-yellow flowers, and a zone of red or crimson at the base of the ray florets. Several distinctive names were once given to certain forms, but they have now become so mixed up that the craze for naming mere colour variations seems to have happily ceased.

Culture &c. as above.

G. pulchella. — A charming annual 2–3 ft. high, with lance-shaped coarsely and sparsely toothed leaves, and crimson flowers, tipped with golden-yellow.

Culture &c. as above. Increased by seeds sown in cold frames in autumn or gentle heat in spring.

ACTINELLA. — A small genus of more or less downy or hairy perennial or annual herbs, with alternate entire or pinnately lobed leaves. Flower-heads yellow. Receptacle hemispherical or conical. Ray florets spreading 3-toothed or cleft.

A. grandiflora (*Pigmy Sunflower*).—A pretty perennial 6–9 in. high, native of the Colorado Mountains. During the summer months it produces yellow flower-heads about 3 in. across, and looks effective grown in masses. There are a few other species to be met with in botanic gardens, but they are not well known.

Culture and Propagation. — This species flourishes in light sandy soil in sunny parts of the flower border. It may be increased by division in spring, or by seeds, if ripened, sown in cold frames when ripe, or in spring.

Tribe VII. ANTHEMIDEÆ.—Herbs or shrubs often emitting a fragrant odour. Leaves usually alternate and much divided or cut. Disc florets usually yellow, rarely purple, 4–5-cleft. Ray florets strap-shaped, entire or toothed, or shortly tubular. Involucre with bracts in many series. Receptacle naked or furnished with chaffy scales.

ACHILLEA (MILFOIL; YARROW).—A large genus of herbaceous and alpine plants having ternate, simple and finely cut leaves, and small flowers in corymbs. Bracts of the involucre oblong, often shrivelled looking. Receptacle with chaffy scales. Ray florets few, comparatively large and showy. Pappus none.

Culture and Propagation.—Achilleas grow freely—sometimes too freely—in ordinary garden soil. The larger growing kinds are effective in groups in the border, while the dwarfer kinds may be used in the rock garden. They may be increased by dividing the roots in spring; by cuttings of the young shoots inserted in light soil in a cold frame at the same period or during the summer months; or by seeds sown in cold frames when ripe; in the open border in April and May; or in gentle heat in March. The seedlings should be pricked out when the seeds are sown under glass, and may be transferred to the open ground in spring or autumn, according to the period of sowing the seed. When sown out of doors the seedlings need only be thinned out, leaving the others to bloom where the seed was sown.

A. ægyptiaca (*Egyptian Yarrow*).—A silvery plant 12–18 in. high, native of Egypt and Greece, with pinnate leaves having bluntly lance-shaped toothed leaflets, and fine yellow flowers in terminal corymbs in summer. Best in sunny places.

Culture &c. as above. Easily increased by division in spring.

A. Ageratum (*Sweet Maudlin*).—A pretty compact alpine native of Greece. Leaves narrow with beautifully crisped edges, and arranged in dense silvery rosettes. Flowers in summer, large pure white, borne singly on stalks 6–8 in. high.

Culture &c. as above.

A. asplenifolia.—A pretty N. American plant about 18 in. high. Lower leaves stalked, pinnately cut with pinnate lobes; upper ones pinnate. Flowers in summer and autumn, golden-rosy, small, in compound corymbs.

Culture &c. as above.

A. atrata. — A handsome Austrian alpine, with deep shining green leaves in rosettes. Flowers in August, white.

Culture &c. as above.

A. Clavennæ.—A pretty tufted hoary Austrian species 6–10 in. high, with leaves twice pinnately cut into linear obtuse segments. Flowers in spring and summer, white, in compact heads.

Culture &c. as above. Easily increased by division of the tufts in early autumn or spring.

A. Eupatorium (*A. filipendula*). — A handsome Caucasian species 4–5 ft. high, with rough hairy pinnate leaves, lobed and serrated. Flowers from June to September, bright yellow in dense rounded heads, often 5 in. across, and lasting a long time.

Culture &c. as above.

A. Herba-Rota. — A pretty sweet-scented plant about 6 in. high, native of France. Leaves lance-shaped serrate. Flowers in May, white, in loose corymbs on long stems.

Culture &c. as above.

A. macrophylla.—A distinct Tyrolese Milfoil 1½–2 ft. high, with large smooth green leaves pinnately divided into oval lance-shaped segments, more or less irregularly toothed. The white flower-heads are borne in loose clusters and usually appear in July and August, but sometimes as early as May and June.

Culture &c. as above. This species may be increased readily by division in early autumn or spring, but unlike most of the other kinds it prefers a somewhat shaded position in the flower border or rock garden.

A. Millefolium roseum. — The rose-coloured variety of the common British Yarrow is well worth growing as a border plant. It grows 1–3 ft. high, with strap-shaped deeply cut leaves. Flowers in ovoid heads from early summer till autumn.

Culture &c. as above.

A. mongolica.—A beautiful Mongolian plant about 1½ ft. high, with entire leaves and pure white flowers produced in July and August.

Culture &c. as above.

A. pectinata.—A pretty tufted Italian alpine, with bright green, pinnately cut leaves about 2 in. long. Flowers in June, white.

Culture &c. as above.

A. Ptarmica. — A fine British plant 1–2 ft. high, with lance-shaped, regularly toothed leaves, and corymbs of pure white flowers in summer and autumn. The varieties *Snowball*, *elegans*, *flore pleno*, and *The Pearl*—especially the latter—are splendid for cutting. The plants are vigorous in sunshine, but the flowers do not last so long as in partially shaded places.

Culture &c. as above.

A. rupestris.—A native of S. Italy, 8 in. high, with a tufted rootstock, and rosettes of linear spoon-shaped entire silvery leaves becoming scattered up the stem. Flowers in May, white, greenish in the centre, in corymbs 1–1½ in. across.

Culture &c. as above. Increased easily by division in spring.

A. serrata.—A handsome Swiss plant 1–2 ft. high, with silvery white lance-shaped deeply serrate sessile leaves. Flowers in summer, large, white, numerous, in small corymbose clusters forming a somewhat spreading panicle.

Culture &c. as above. Increased easily by division in spring.

A. tanacetifolia. — A fine European plant 2½ ft. high, with silvery cut leaves and large heads of pale lemon-yellow flowers.

Culture &c. as above. Increased easily by division in spring.

A. tomentosa. — A beautiful densely tufted European species 8–12 in. high, with woolly leaves twice pinnately cut into linear acute segments. Flowers in summer, bright yellow, in compound corymbs.

Culture &c. as above. Easily increased by division of the tufts in spring. This species likes rather dry gritty soil in sunny places, and may be used for making a carpet in front of borders or in the rockery.

A. umbellata. — A pretty dwarf rock plant 4–5 in. high, native of Greece. Leaves heavily clothed with a handsome silvery down, and regularly cut into obovate entire lobes. Flowers in June, white, 6–8 in a simple umbel.

Culture &c. as above. Increased easily by division in spring.

SANTOLINA (Lavender Cotton; French Lavender).—A genus of about 8 species of fragrant undershrubs, with alternate, pectinate, or clustered and pinnately cut leaves. Flower-heads usually yellow, roundish, on long stalks. Corollas regular. Achenes 3–4-, rarely 5-, angled.

Culture and Propagation. — Santolinas grow well in ordinary garden soil, and are very effective at a short distance when grown in masses. They are easily increased by division of the roots in autumn or spring. Cuttings of the young shoots may also be inserted in sandy soil in cold frames at the same seasons.

S. Chamæcyparissus (*Common Lavender Cotton*).—A pretty, greyish-looking shrubby plant 1–2 ft. high, native of dry and arid places in S. Europe. Leaves small, linear, somewhat fleshy, toothed, close set, and covered with a hoary down. Flowers in July, yellowish, in rounded heads.

Culture &c. as above.

S. incana.—This is considered to be a variety of the preceding, but it is quite distinct from a garden point of view, being dwarfer and more compact in habit, and having the stems and leaves covered with a whiter down. Flowers in summer, bright yellow, in heads like small golden drum-sticks.

Culture &c. as above.

S. rosmarinifolia. — A native of S. Europe, about 2 ft. high, with linear acutish denticulate leaves, the lower ones tubercled on the edges. Flowers in August, yellow, in roundish heads.

Culture &c. as above.

S. viridis. — A distinct plant from Southern France, 1–2½ ft. high, with deep green serrated leaves. Flowers in summer, white tinged with yellow, roundish.

Culture &c. as above.

DIOTIS (Cotton Weed).—A genus containing only one species:—

D. maritima (*D. candidissima*).—An ornamental perennial 8–10 in. high, with hard, almost woody stems, covered with a white or cottony wool. Leaves alternate, oblong, sessile, fleshy, entire or slightly toothed. Flowers in August and September, with yellow roundish heads about ⅓ in. in diameter, and borne in small dense clusters at the tips of the shoots.

Culture and Propagation. — The Cotton Weed is occasionally found on the south coast, and also on the shores of the Mediterranean. It is often used in the rock garden, and as an edging for flower borders. It likes deep sandy soil, and is best increased by cuttings in a shady border, or from seeds if they ripen, sown in cold frames in northern parts, or in the open border in the south and west.

ANTHEMIS (Chamomile). — This genus contains as many as 80 species of smooth or woolly, more or less sweet-scented, annual or perennial herbs, very few of which, however, are worthy of a place in the flower garden. Leaves alternate, once, twice, or thrice pinnately cut into fine divisions. Flower-heads at the ends of the branches; ray florets white or yellow, disc yellow. Achenes smooth; pappus none. Involucre hemispherical or flattish. Receptacle convex, conical, or oblong.

Culture and Propagation. — The Chamomiles are easily grown in ordinary soil, and are particularly useful for rather dry positions. They may be increased by dividing the roots in autumn or spring. Seeds are often produced in abundance, and plants may also be obtained from these, sown either in spring or autumn in the open border, afterwards thinning the seedlings out 9–12 in. apart.

A. Aizoon.—A dwarf compact free-growing species, 2–4 in. high, from N. Greece. Leaves more or less broadly lance-shaped, deeply and sharply toothed, and covered with a silvery-white down. Flowers in summer, about an inch across, white, with a yellow centre.

Although the name here given is the original one, and also the best known in gardens, it may be mentioned that the plant is now more correctly known as *Achillea ageratifolia*.

Culture &c. as above. A fine plant for warm sunny corners in the rockery.

A. Biebersteini.—A pretty Caucasian species 1–2 ft. high, with white silky leaves, pinnately cut into linear 3-lobed segments. Flowers in summer, white, large, with yellow centres. The variety *marschalliana* is similar in habit to the type but bears bright yellow flower-heads an inch or more across.

Culture &c. as above.

A. macedonica.—A pretty Macedonian Chamomile 6–8 in. high, forming a compact bush about 18 in. through. The leaves, which are of a pleasing blue-green tint, are much divided, and the white Daisy-like flowers, with deep yellow centres, are produced throughout the summer months.

Culture &c. as above. Sandy soil and sunny situations suit this plant best.

A. tinctoria (*Ox-Eye Chamomile*).—This pretty species with angular stems 1½ ft. high, and twice pinnately cut serrate leaves, downy beneath, is often found on rough and waste places in England. The flowers are bright yellow, 2–3 in. across, and borne on long stalks in July and August. There are several varieties or forms, *Kelwayi* with fine yellow flowers, and *pallida* with pale whitish-yellow flowers being most distinct.

Other kinds met with sometimes are *A. montana* and *A. Kitaibeli*, the latter with pale yellow Marguerite-like flowers.

Culture &c. as above.

CHRYSANTHEMUM. — A genus of smooth or slightly downy, annual or perennial herbs, somewhat woody at the base. Leaves alternate, entire, lobed, toothed, or incised and dissected. Flower-heads solitary or in loose or dense corymbs at the ends of the branches. Involucre hemispherical, flat, or rarely bell-shaped. Receptacle flat, convex, or hemispherical. Pappus none or cup-shaped.

C. arcticum. — A pretty Siberian species about 1 ft. high. Flowers during the summer, white tinged with lilac or rose.

Culture and Propagation. — A good plant for the rockery. It grows well in ordinary soil and may be raised from seeds sown in gentle heat in early spring. The seedlings are pricked out and by the end of May will be ready for the outside..

C. argenteum.—An herbaceous perennial about 1 ft. high, native of the Levant. Leaves twice pinnate, silvery, with acute entire leaflets. Flowers in July, white.

Culture and Propagation.—This is suitable for the border or rockery, in ordinary soil. May be increased by dividing the roots in spring; by cuttings at the same period; or from seeds sown in gentle heat, afterwards transplanting the seedlings about May to the open border.

C. carinatum (*C. tricolor*). — A handsome showy annual about 2 ft. high, native of N. Africa. Leaves twice pinnate, fleshy, smooth. Flowers during summer, white, purple &c.

There are many fine varieties of this species, among which may be mentioned: *Burridgeanum*, with flowers 2–3 in. across, symmetrically zoned with white, lilac, purple, yellow, maroon &c., with a dark centre. The golden-leaved form of *Burridgeanum* is very distinct. The variety *album* has a yellow blotch at the base of the white ray florets surrounding a purple disc. *Luteum* is a variety in which the ray and disc florets are of a soft nankeen-yellow. *Venustum* has the upper half of the ray florets white, the lower half purple-violet, and the disc purple. Other varieties are *Morning Star*, large primrose-yellow; *John Bright*, golden-yellow; and *atrococcineum* or *The Sultan*, deep crimson.

Culture and Propagation.—Besides the single forms there are also many fine double white and double yellow ones. The species and its varieties are beautiful plants for the flower border, or in beds by themselves. They are easily raised from seeds sown in rich sandy loam in April, thinning the seedlings out to 9 or 12 in. apart, where they are to bloom. Seeds may also be sown in slight heat in March, and the seedlings planted out at the end of May. They may also be sown from September to October, and the plants wintered in cold frames or greenhouses, from which they may be transferred to the open ground the following spring, or flowered in pots. The plants will develop a bushy habit more quickly if the point of the main shoot is pinched out.

C. Catananche. — A beautiful perennial 4–6 in. high, native of the Greater Atlas Mountains. Leaves springing from stout rootstocks, stalked, irregularly cut into linear acute lobes. Flowers in spring, pale yellow, 1½–2 in. across, tipped with purple, and blood-red at the very base of the ray-florets. Disc deep yellow.

Culture and Propagation.—This is an excellent plant for warm and sheltered parts of the rock garden. It grows best in well-drained gritty loam and leaf mould, and may be increased by division in early autumn, so that the divided portions will become well established before winter sets in.

C. cinerariæfolium. — A native of Dalmatia with leaves pinnately cut into lobed segments. Flowers in July and August, solitary, 1½ in. across, white, with a yellow centre borne on stems a foot or more high. The famous Dalmatian insecticide powder is obtained from this plant.

Culture &c. as above for *C. Catananche.*

C. coronarium (*Crown Daisy*). — A charming and very showy annual 3–4 ft. high, native of S. Europe, with leaves twice pinnately cut into lobed and toothed segments. Flowers from July to September, bright yellow, 2–3 in. across on long stalks.

Cultivation and selection have produced some charming double varieties, with white, orange, lemon, and sulphur-yellow flowers.

Culture and Propagation. — Exactly the same as for *C. carinatum* above.

C. frutescens (*Pyrethrum frutescens*). *Paris Daisy; Marguerite.*—A beautiful smooth, shrubby perennial 1½–3 ft. high, native of the Canary Islands. Leaves more or less glaucous, pinnately cut into linear-toothed segments. Flowers in summer and autumn, solitary, on slender erect stalks, 2–3 in. across, with pure white ray florets surrounding a yellow disc. The variety *Etoile d'or* is the well-known Yellow Marguerite, the leaves and flowers of which are larger than those of the ordinary type. In the late spring months—April and May—vast quantities of cut flowers of this variety are imported from the Continent and find a ready sale in English markets. Other forms known as *fœniculaceum*, with Fennel-like leaves, *anethifolium* and *grandiflorum* are sometimes met with.

Culture and Propagation.—The Marguerite, unfortunately, is not a perfectly hardy plant, except perhaps in the very mildest parts of the south and west, and even there it would probably require a little protection in winter. Massed in groups in beds or borders it makes a charming display during the summer and autumn. The production of flowers is greatly increased by frequent cutting, and all dead or dying blossoms should be picked off, and others thus induced to develop.

In this country the Marguerite is usually increased by cuttings taken in autumn from old plants (cut down some time previously) and inserted in sandy loamy soil in cold frames. They may be placed singly into pots, and grown on with plenty of light and air during the winter, but frost must not be allowed to touch them. (Bushy plants are obtained by pinching out the points of the shoots). At the same time the air must not be kept in a stagnant condition, or the 'maggot'—that deadly enemy of the Marguerite—will surely appear, as it also will under warm greenhouse treatment. The maggot seems to attack only plants which have been grown in too close and warm an atmosphere. Unfortunately it cannot be destroyed with insecticides or washes of any sort, as it burrows its milky way in white irregular lines beneath the surface of the leaves. The only sure remedy is to pick off affected leaves and burn them, and have the plants moved at once to positions where they will obtain as much light and air as possible, and no artificial heat, or only just sufficient to keep the frost out.

On the Continent seeds are sown in March or April in gentle heat, and the seedlings are ready for planting out in May or June, when danger of frost is over.

The plants, however, are so readily multiplied by means of cuttings that it is scarcely worth while raising them from seed.

C. indicum (including **C. sinense**).—These two names indicate geographical forms of the same species which is widely distributed and more or less cultivated, from India eastwards to China and Japan. The plants are somewhat shrubby in growth and range from 1 to 4 or 5 ft. high, according to variety. The young stems and leaves are covered with a soft whitish down. Leaves alternate, usually oval-heart-shaped in outline, more or less regularly incised toothed or lobed. Flowers in autumn in panicled corymbs, various in colour.

The flowering Chrysanthemums are now so well known, and form such an attractive feature of the autumn, that one can scarcely believe the beautiful forms to have been developed within the last 100 years. The first plant in this country was cultivated at Kew Gardens in 1790, whither it had been sent by a French gardener M. Cels. For about 30 years gardeners in England and France were 'selecting and improving' it, and in 1825 the first exhibition in this country took place. But it was not until 1846 that competitive shows were initiated, soon after the 'Pompon' or small-flowered forms had been introduced from China. In 1862 the first of what are known as 'Japanese' varieties was introduced, and to-day this section has reached a very high state of perfection and is cultivated in hundreds of thousands. Gardeners now recognise the following sections:—

Incurved, in which the florets curve upwards and inwards towards the centre.

Recurved or *Reflexed*, in which the florets curve outwards and downwards from the centre.

Anemone or *Quilled*, in which the outer florets are strap-shaped, the inner ones tubular and densely packed together. There are large- and small-flowered forms of this group.

Pompon or *Chusan Daisy-Flowered.* Flowers small, numerous, florets strap-shaped, regular, mostly reflexed. Some forms have the florets deeply and regularly notched or incised.

Japanese.—Flowers large, loose, with long drooping twisted or untwisted, smooth or hairy, strap-shaped or threadlike florets, more or less dishevelled in appearance.

Culture.—Out of the hundreds of varieties now grown comparatively few, unfortunately, will be found to flower satisfactorily out of doors owing to the lateness at which the flowers are produced. The earlier flowering sorts are therefore best for the outdoor garden, and in favourable seasons many of the later ones will also come to perfection especially if sheltered by a wall or a screen of shrubs. The plants themselves are quite hardy, and many kinds come up year after year, and flower profusely in cottage gardens.

To obtain the best results, the soil for Chrysanthemums cannot be too good. A rich and rather heavy fibrous loam suits them well. During the summer they may receive frequent waterings of liquid manure or a mulching of good rotted cow manure. They will grow well without either, but where fine blooms are required, good feeding is also necessary.

Propagation.—Chrysanthemums are readily raised from cuttings any time between November and March. The short stout shoots which spring from the roots make the best cuttings. When prepared they may have 3 or 4 joints, the cut with a sharp knife being made straight across beneath the lower one. Shoots without flower-buds at the tip should be selected. The cuttings should be inserted either singly in small pots or several in a large one, or in shallow boxes in sandy soil, and kept in a close frame with plenty of light, or in a cool greenhouse. The latter is better in severe winters, as covering up and protecting cold frames from frost means a great loss of light. The young plants may be potted on when well rooted, and as soon as they are about 6 in. high the shoots may be taken off leaving 3 or 4 joints, from which side branches will develop, and during the season each one will branch naturally, and show flower from July and August onwards according to variety. The tops taken off may be struck in the same way as the original cuttings. The young plants may be put out in May about 1½–3 ft. apart, where they are to flower.

Suckers—that is basal shoots with roots—may also be used for purposes of increase. The old 'stools' can also be divided about March, and thus increase the stock. Where new varieties are required seeds are sown in gentle heat in February or March. The seedlings are pricked off when large enough and grown on in a cold frame as near the glass as possible to make them sturdy, and afterwards receive the same treatment as plants from cuttings or suckers.

The large mop-headed blooms seen at exhibitions in November are produced on a quite different principle. All the side shoots and flowers but one are sacrificed so that the vigour may be absorbed by the solitary bloom on the top of a lanky stalk. They are all grown in pots and require a good deal of time and knowledge of the individual varieties to bring them to perfection. The plants are highly fed with artificial manurial foods (like prize pigs and poultry) and the flowers are carefully twisted and curled —'dressed' it is called—with tweezers, so that the production of such flowers is a somewhat expensive operation.

Outdoor plants fortunately only require to be grown as nature intended, and from a floral and decorative point of view, not to mention their value as cut flowers, they are of far more use. Besides, they are rarely attacked with fungus diseases, as are their highly fed brethren, and if at first they get a touch of mildew this soon disappears with increased vigour; green or black fly are occasionally a trouble, but a sprinkling of fine soot or a syringing with soft-soapy water will get rid of them very soon. After a day or two the soot of course can be easily syringed off.

Staking.—Many of the taller varieties of Chrysanthemums should have a rather stout stake placed to them at the time of planting, as their stems are often too weak to hold themselves erect without support, especially when laden with blossom. If left untied to stakes the shoots flop about and become very much twisted and untidy, and the flower-heads are also spoiled with the wet and dirt when near the ground. Although a good deal of time is taken up in tying the shoots and keeping them properly spaced out, it is by no means wasted.

Disbudding.—Although many varieties seem to require but little or no thinning out of the buds, a large number will be benefited by the process. As a rule several buds form at the end of each shoot and in the axils of the upper leaves, and unless some of them are destroyed the majority of blooms will be rather small and perhaps rather badly shaped. This is chiefly because there are more buds on the plants than can be properly supported. It is therefore advisable to rub out with the finger and thumb all the buds on each shoot except one or two of the best and most promising. Although the work is quite easy to an expert, owing to constant practice, the amateur will find at first that he will rub out the very buds which he would like to retain, because they are sometimes so closely situated to the undesirable ones. A little practice and care however will soon overcome this difficulty.

The following is a selection of the kinds suitable for outdoor cultivation:—

White.—Elaine, Mdlle. Lacroix, Fair Maid of Guernsey, Felicity, Avalanche, Lady Selborne, Mdme. Desgrange, Barbara Forbes, Lady Fitzwigram, Market White, Mytchett White, White Grunerwald.

Blush Pink or Soft Rose.—Bouquet Fait, Blushing Bride, Early Blush, Mrs. J. R. Pitcher, Albert Rose, Coral Queen, Ivy Elphic, La Vierge, Mrs. Cullingford, La Triomphe, Mdme. A. Nonin, Louis Lionnet, Rose Wells, Marie Massé, Mdlle. Guindudeau, Martinmas, Strathmeath, Miss Davis.

Crimson.—Cullingfordi, W. Holmes, King of the Crimsons, Chas. Gerard, Mdlle. Sabatier, Préfet Cassagneau, Pride of the Market, Ruby King.

Purple. — Alex. Dufour, Bouquet Æstival, Edie Wright, Edith Syratt, François Vuillermet, General Hawkes, Mdme. Eulalie Morel, Mdme. Gajac.

Yellow and Orange.—George Glenny, Jardin des Plantes, Buttercup, Phœbus, President Hyde, Geo. Wermig, Mrs. Hawkins, Golden Fleece, Mons. G. Dubor, Mrs. Burrell, October Yellow, Orange Child, Ryecroft Glory, Blanche Colomb, California, Edwin Rowbottom, Ivy Stark, Lemon Queen.

Bronze and Red. — Source d'Or, Bronze Bride, Bronze Prince, Gaspard Boncharlat, Harvest Home, Nellie Brown, Gloire du Rocher, Val d'Andorre, Wm. Robinson, Julie Lagravere, M. Leveque Fils.

POMPONS

White.—Cedo nulli, Eleonore, La Pureté, Maid of Kent, Mdlle. Marthe, Snowdrop, Sœur Melanie, Petillaud, White St. Croats.

Blush Rose and Pink.—Little Pet, Marabout, Rosinante, Illustration, Longfellow, Mdme. Jolivart, Miss Davis, Mr. Selly, Nanum, St. Croats, St. Mary, Mrs. Cullingford, Pygmalion, Rose d'Amour, Rose Trevenna.

Yellow and Orange. — Cedo nulli, Dolly, Drin Drin, General Canrobert, Golden Mdlle. Marthe, La Vogue, Lizzie Holmes, St. Michael, W. Westlake, Yellow Gem, Flora, Canary, Fiberta, Frederick Marronet, Golden Drop, L'Ami Condorcet, Mignon, Précocité.

Bronze and Red.—Little Bob, Maud Pitcher, Mr. W. Piercy, Piercy's Seedling, Toreador, Aurora Borealis, Elsie Walker, Florence Carr, Miss Bateman, Wm. Payne, Indian Red.

Purple and Crimson. — Anastasia, Adonis, Perle des Beautés, President, Prince Victor, Rubra perfecta, Trafalgar, W. Kennedy.

C. lacustre.—A robust perennial with angular stems 2–3 ft. high, native of Portugal. Leaves fleshy, bright green, oval-lance-shaped, irregularly toothed, upper ones stem-clasping. Flowers in late summer and autumn, pure white, 2–3 in. across; disc at first yellow, afterwards purple. Also known as *Leucanthemum.*

Culture and Propagation. — This plant likes deep rich soil, and should be moved about every two years, and have fresh soil added. It may be increased by dividing the roots in late autumn or preferably in early spring. Seeds may also be sown in the open in April or May in a shaded spot, and the seedlings may be placed in their flowering quarters for the following year about September or October.

C. latifolium. — A fine European species 2–3 ft. high, with large broadly lance-shaped, toothed fleshy leaves. Flowers in summer and autumn, 3–4 in. across, white ray florets, yellow centre. This species has been found to cross with *C. maximum*, and several forms intermediate between the two have resulted.

Culture and Propagation the same as for *C. maximum.*

C. Leucanthemum (*Ox-Eye Daisy*). This beautiful British perennial 2–3 ft. high is found growing wild in meadows, waste places, railway embankments &c., and is worth a place in the garden. Leaves bluntly and somewhat pinnately cut. Flowers from June to August, 2 in. across, white, with yellow centres.

Culture &c. as above for *C. lacustre.* Increased by seeds or division. This species is best treated as a biennial and the plants should be renewed every year either by seedlings or fresh offsets from the old tufts.

C. maximum. — A handsome strong-growing Pyrenean plant 2–4 ft. high, with broadly linear lance-shaped strongly toothed leaves 3–5 in. long, the lower ones stalked, the upper sessile. Flowers from June to October, 2–3 in. or more across, pure white, with a yellow centre.

Culture and Propagation. — On light dry soils this species grows only about 15 in. high, but flowers freely. In deep moist soils in sunny positions it attains its greatest height and vigour and makes handsome flowering bushes. It may be easily increased by dividing the roots in autumn or spring; or by cuttings of the young shoots inserted in sandy soil in early summer under handlights and kept shaded from bright sunshine until nearly rooted. Seeds may also be sown in the same way as recommended above for *C. lacustre.*

C. multicaule. — A glaucous Algerian annual 6–12 in. high, with fleshy linear spoon-shaped leaves pinnately cut or trisected. Flowers in July and August, solitary, 1½–2½ in. across, golden-yellow.

Culture &c. as above for *C. carinatum.* This species makes good dwarf tufts or carpets and is useful for fronts of borders or rockeries. May be raised from seed in spring or autumn.

C. segetum (*Corn Marigold*). — A handsome British annual about 1½ ft. high, with stalked obovate, toothed and lobed leaves, lower ones pinnately cut, upper oblong, half stem-clasping. Flowers from June to September, 2 in. across, golden-yellow. The variety *grandiflorum* has larger flowers.

Culture and Propagation.—Seeds of the Corn Marigold should be sown annually in the open border in ordinary good soil either in autumn or spring. If in autumn there is a better chance of flowering early the following year.

C. serotinum (*Pyrethrum uliginosum*).—*Great Ox-Eye Daisy.*- A handsome N. American perennial 4–6 ft. high, with stout stems and smooth lance-shaped sharply toothed sessile leaves 3–4 in. long. Flowers in September and October, solitary, about 3 in. across, pure white rays with a yellow centre.

Culture and Propagation.—This fine species is very common in cottagers' gardens, and is known popularly as the Michaelmas Daisy, as it is always in bloom at Michaelmas. It thrives in ordinary garden soil and naturally increases itself if left alone. The rootstocks may be split up in early spring to increase the stock. By pinching out the tips of the shoots in May or June, dwarfer and more branching plants are obtained.

PYRETHRUM.—Botanically there is practically no difference in the structure of *Pyrethrum* and *Chrysanthemum*, except that the flowers of the former have a 'pappus' in the form of a raised membranous border, and angular, but not 'winged,' achenes. Some of the plants described in this work as Chrysanthemums (*e.g. C. frutescens, C. serotinum, C. lacustre*) are also to be found described under Pyrethrum by some authors.

Culture and Propagation. — Most of the Pyrethrums are easily grown in ordinary good and well-drained garden soil. Those which may be grown as annuals require the treatment as described for such at p. 78, while the perennial varieties may be increased by division or seeds. Besides these general instructions, special cultural remarks are attached to each species described.

P. achilleæfolium.—A pretty Caucasian species about 2 ft. high, with finely cut silky or downy leaves. Flowers in summer, golden-yellow, almost globular, few, on long stalks in loose corymbs. This species is also known in gardens as *Achillea aurea.*

Culture &c. as above. Increased by division in early spring, or seed sown in cold frames when ripe, or in gentle heat in spring, afterwards transplanting the seedlings about May to the open border. The plants should be grown in deep moist soil.

P. corymbosum.—A European species about 1 ft. high, with angular stems, and leaves pinnately cut into lance-shaped deeply incised and sharply toothed lobes.

Flowers in July, white, corymbose. Involucre rusty-coloured.

Culture &c. as above for *P. achilleæfolium.* Increased by division and seed.

P. decaisneanum. — A rare Japanese species 1–1½ ft. high, with obovate pinnately cut leaves. Flowers 2½–3 in. across, pale yellow. This species is also known as *Chrysanthemum decaisneanum.*

Culture and Propagation.—It may be increased by seeds sown in cold frames when ripe or in spring, and the seedlings may be transferred to the open ground in spring or early autumn according to the period of sowing. Division of the tufts, however, in spring, is an easier method of multiplying the plants.

P. macrophyllum. — A vigorous Hungarian perennial with downy stems about 3 ft. high. Leaves large, almost sessile, pinnately parted, with broadly lance-shaped and coarsely toothed lobes. Flowers in June and July, yellowish-white, with a deeper yellow disc. Ray florets 5–6, strap-shaped, obovate, 3-toothed.

Culture and Propagation. — This species may be easily increased by division of the root in autumn or spring, or from seeds sown in the latter season in the open border. The seedlings may be thinned out or transplanted 2–3 ft. apart.

P. marginatum. — Another Japanese species with downy stems and wedge-shaped oblong leaves, pinnately cut towards the apex, and downy beneath. Flowers in autumn, deep yellow, rather small, in rounded corymbs. Also known as *Chrysanthemum marginatum.*

Culture &c. as above for *P. decaisneanum.* Increased by seeds or division in spring.

P. parthenifolium aureum (*Golden Feather*). — This beautiful free-growing plant is well known as an edging for borders &c. and looks well when the flowers are kept picked off. Although perfectly hardy and a perennial, or at least biennial, it is usually raised from seeds sown in light heat every spring, and treated as an ordinary annual. It thrives in ordinary soil. There are several sub-varieties of *aureum* now grown, some preferring one, some another. They are: *cristatum*, with golden curled Parsley-like leaves; *Golden Moss*, very dwarf and mossy yellow foliage; *laciniatum*, with deeply cut Fern-like leaves; *selaginoides*, near the ordinary form, and *Golden Gem*, a double-flowered form.

P. Parthenium (*Common Feverfew*). A strong-smelling European perennial about 2 ft. high, with deeply cut, lobed and toothed leaves, and white flowers with yellow centres in June. The double-flowered variety *flore pleno* is the only form worth growing. It flourishes in ordinary good garden soil and produces immense quantities of blossom during the early summer months, and also again in the autumn if the first crop is quickly cut. It is rather extensively grown in some market gardens for supplying cut flowers. Except however in the extreme south and west, it seems to suffer a good deal in severe winters from wet and cold. It is therefore best protected by means of old lights placed over the plants, or the latter may be taken up, potted, and wintered in cold frames until spring, when they may be again planted out and, if need be, increased by dividing the tufts.

Some of the finest forms of the double Feverfew are *eximia*, which has very rounded pure white heads of flower; and its forms *crispa*, with deeply cut Parsley-like leaves; *grandiflora*, with large flower-heads; *pyramidalis*, with a pyramidal habit of growth; and *nana aurea*, a dwarf yellow-leaved form with large white flower-heads.

P. roseum. — A beautiful Caucasian perennial 1–2 ft. high, with decurrent pinnately cut leaves, having deep green lance-shaped segments. Flowers in early summer, 2–3 in. across, with rosy ray florets and a yellow disc.

Culture and Propagation. — Of late years gardeners have devoted great attention to the improvement of this species, with the result that one of the finest and hardiest races of beautiful hardy flowers has been produced. There are single and double-flowered forms of almost every shade of colour except blue, and practically all the varieties, single and double, are excellent for cutting. Though in their prime in June, flowers can be induced to appear during the summer by cutting the flowers as they develop. And when fairly finished the stems may be cut down. New ones will spring up and flower in autumn. It is questionable, however, whether it is a wise plan to exhaust a plant by making it produce a double crop in one year, when nature only intended one.

The plants, however, are easily increased either by seeds or division of the roots. It is best to divide the roots in early spring, rather than in autumn, as experience teaches that when done at the latter period many of the plants are killed during the winter, especially if wet and cold. The reason probably is that new roots have not sufficiently developed to be of use to the plant.

The soil cannot be too rich. A good well-manured loam suits them best, but good plants will grow in ordinary soil fairly enriched with humus. A mulching of well-rotted manure or spent mushroom beds in summer is beneficial.

There are many named varieties now grown. The following is a selection:—

Double Varieties

WHITE:—*Aphrodite*, *Carl Vogt*, *La Belle Blonde*. *Penelope*, *Princesse de Metternich*.

BLUSH WHITE:—*Boocage*, *Déesse*, *Dr. Livingstone*, *Empress Queen*, *Florentine*, *La Vestale*, *Madame Munier*, *Nancy*, *Queen Sophia*.

YELLOW:—*Solfaterre*, *Toison d'Or*, *Virgo*.

ROSE AND PINK:—*Evelyn*, *Leonard Kelway*, *Mdlle. Patti*, *Magician*, *Paul Journu*, *Rupert*.

RED, CRIMSON, CARMINE:—*Alfred Kelway*, *Amethyst*, *Beauty of Laeken*, *Capt. Boyton*, *Duchess of Edinburgh*, *Ernest*, *Figaro*, *Imbricatum plenum*, *King Oscar*, *Lischen*, *Meteor*, *Michael Buchner*, *Milton*, *Multiflorum*, *Ormonde*.

WITH GOLDEN CENTRES:—*Diana*, *Emile Lemoine*, *I. N. Twerdy*, *Marchioness of Lorne*.

Single Pyrethrums

WHITE-FLOWERED VARIETIES:—*Apemantus*, *Armida*, *Dawn*, *Empress of India*, *Magnet*, *Millicent*, *Oliver Twist*, *Twilight*.

CRIMSON-FLOWERED VARIETIES:—*Cervantes*, *Clemence*, *Conspicuum*, *Dorothy Kelway*, *Excelsior*, *Firefly*, *F. M. Peacock*, *Francis*, *Gladiator*, *Golconde*, *Honorable*, *James Kelway*, *J. G. Clarke*, *Juno*, *Lorna Doone*, *Mikado*, *Mr. Santley*, *Mrs. Syme*, *Ornement*, *Paul Jones*, *Peter Barr*, *Prince Rudolph*, *Princess Charlotte*, *Robert Bruce*, *Rodney*, *Saturnus*, *Scorpio*, *Stanley*, *Tasso*, *Triumph*, *Vivid*, *W. B. Child*, *Wonder*.

ROSE, PINK, OR PURPLE-FLOWERED VARIETIES:—*Alice*, *Alroy*, *Amoret*, *Angelo*, *Apollyon*, *Ascot*, *Bassanio*, *Beatrice Kelway*, *Belianis*, *Bellerius*, *Belvidere*, *Bertie*, *Bianca*, *Bismarck*, *Blucher*, *Cassiope*, *Conspicuum*, *Decoy*, *Dr. Nicholls*, *Fanny*, *Heline*, *Ianthe*, *Jessie*, *La Superbe*, *Libra*, *Lord Roberts*, *Lufra*, *Macbeth*, *Marmion*, *Mme. Grisi*, *Model*, *Mrs. Bruce Findlay*, *Othello*, *Rufus*, *Sheridan*, *Sprightly*, *Sunbeam*, *Wagstaff*.

P. Tchihatchewi. — A handsome densely tufted species about 2–3 in. high, native of Asia Minor. Leaves twice pinnately cut, smooth dark green. Flowers in early summer, white rays, yellow disc, small, solitary, on stalks 3–6 in. long.

Culture and Propagation. — This species is useful for covering dry slopes or banks or under trees. It is usually increased by seeds sown in spring in gentle heat, the seedlings afterwards being planted out about 3 in. apart to make a carpet of the foliage. It may, however, also be multiplied by dividing the tufts in spring in the southern and western parts of the kingdom where it is not so likely to be injured by the frosts of winter.

MATRICARIA.—A genus containing about 20 species, mostly weeds. Leaves much divided with narrow lobes. Flowers white with yellow centres. Receptacle broad, flat, or conical, after flowering.

M. inodora fl. pl.—This is the double-flowered form of a common British annual or biennial weed. Leaves finely cut and divided. Flowers large, pure white. The stems are somewhat creeping, and form with the foliage a dense carpet, being thus useful for the front of borders, the foot of rockwork &c.

Culture and Propagation.—The plant grows in any soil and may be increased by division in early autumn or in spring; or cuttings of the non-flowering shoots may be inserted in sandy soil in spring or autumn, and when well-rooted may be transferred to the open border.

Seeds may be found in the double forms occasionally and may be sown as soon as ripe in cold frames, and transplanted in spring.

TANACETUM (TANSY). — A genus containing about 30 species of annual or perennial, often scented, downy or silky herbs, with alternate, variously cut leaves, rarely entire and toothed. Flowers yellow, in small corymbose heads. Florets and achenes often glandular.

Culture and Propagation.—The following are the only plants of the genus worth growing. They thrive in ordinary soil, and may be easily increased by division in autumn or spring. They are chiefly useful for making carpets or borders as a relief to taller and more brilliant plants.

T. leucophyllum.—A native of Turkestan about 9 in. high, covered with silky-white hairs. Leaves sessile or shortly stalked, roundish ovate; lower ones twice, upper once, pinnately cut. Flowers in summer, golden-yellow.
Culture &c. as above.

T. vulgare crispum. — This variety is cultivated for the beauty of its deeply cut emerald green foliage, with more or less waved and crested segments. It is a good plant for the rockery, and is easily increased by dividing the roots in autumn or spring. The flowers should be picked off.
Culture &c. as above.

ARTEMISIA (Mugwort; Southernwood; Wormwood).—This genus contains 150–200 species of more or less hoary, scented herbs or low bushes, with alternate, entire, incised, or once, twice, or thrice pinnately dissected leaves. Flowers rather small, more or less drooping, in panicled racemes or heads, or solitary or corymbose. Disc florets tubular. Ray florets, if any, slender, pointed.
Culture and Propagation.—Artemisias are grown chiefly for the graceful appearance of the foliage, and not the flowers, which are not of a particularly handsome type. The plants described below thrive in any ordinary soil, no matter how dry, when they are well established. The herbaceous kinds are easily increased by dividing the roots in early spring, or cuttings of the young shoots may be inserted in sandy soil in cold frames and kept shaded from the sun until fairly well rooted; the shrubby kinds from cuttings in summer and autumn in the same way; and the annuals from seeds sown in the open border in April and May or in cold frames when ripe and afterwards transplanted in spring. The Wormwood (*A. Absinthium*), with silky white divided leaves and drooping roundish yellow flower-heads, may be mentioned here as it is so well known as a herb, and also because it enters largely into the composition of the liqueur called Absinth.

A. Abrotanum (*Southernwood*). — A fragrant-smelling deciduous shrub 2–4 ft. high, native of Europe. Lower leaves twice, upper once, pinnate. Flowers from August to October, yellowish.
Culture &c. as above. Increased by division or cuttings.

A. alpina.—A dwarf tufted Caucasian species 6–10 in. high. Leaves pinnately cut into linear lobes, and covered with silky white hairs. Flowers in summer, yellow. A good plant for the rockery.
Culture &c. as above. Increased by division or cuttings.

A. anethifolia.—A graceful perennial 3–5 ft. high, with greyish-green leaves, finely divided into fine thread-like segments. Flowers late in summer, small, whitish, in a panicle nearly 2 ft. long.
Culture &c. as above. Increased by division or cuttings. Native of Siberia.

A. annua.—A graceful annual 5–6 ft. high with bright green, deeply cut leaves, and small yellow flowers in panicles.
Culture &c. as above. Increased by seeds sown in the open border in April and May. Native of E. Europe and N. Asia.

A. argentea.—A pretty rockery plant about 1½ ft. high, native of Madeira. Leaves ovate oblong, freely divided, and densely covered with silky white hairs. Flowers in July, pale yellow, in roundish, closely packed heads.
Culture &c. as above. Increased by division or cuttings.

A. cærulescens.—A beautiful evergreen shrub about 2 ft. high, native of S. Europe. Leaves silky white, mostly lance-shaped, the lower ones variously divided. Flowers in August, bluish, in erect cylindrical racemes.
Culture &c. as above. Increased by cuttings or division.

A. cana.—A distinct and vigorous N. American perennial 2–3 ft. high. Lower leaves wedge-shaped, sharply 3-cleft; upper ones linear-lance-shaped, 3-nerved, all covered with silky white hairs. Flowers in August, yellow, small, in a close-spiked panicle.
Culture &c. as above. Increased by division or cuttings.

A. frigida.—A silvery creeping Siberian species 6–12 in. high, with leaves pinnately divided into narrow segments. Flowers in summer, dull yellow, in racemose panicles. Useful for rockwork.

Culture &c. as above. Increased by cuttings or division.

A. lanata.—A very dwarf and pretty rock plant, native of S. Europe, with silvery grey leaves finely cut like the teeth of a comb. The variety *mutellina* is similar, but the leaves are more loosely divided.

Culture &c. as above. Increased by cuttings or division.

A. maritima.—A British bush 10–18 in. or more high, with white woolly leaves, twice pinnately cut into blunt linear segments. Flowers in August and September, yellowish, erect or drooping, cottony, crowded on short erect panicled spikes.

Culture &c. as above. Increased by cuttings or division.

A. stelleriana.—A silky white vigorous Siberian species 1–2 ft. high. Lower leaves spoon-shaped incised; upper ones bluntly lobed, about 2 in. long, all silvery-white. Flowers in summer, yellow.

Culture &c. as above. Increased by cuttings or division.

A. tanacetifolia. — A pretty Siberian perennial 12–18 in. high with rather downy Fern-like leaves, twice pinnately cut into somewhat linear lance-shaped pointed lobes. Flowers in summer, brownish, in simple terminal racemes.

Culture &c. as above. Increased by cuttings or division.

A. vulgaris (*Mugwort*). — A British plant 3–4 ft. high with furrowed stems and whitish downy leaves twice pinnately cut. Flowers in August, yellow. There is a pleasing variegated variety and also one with golden leaves.

Culture &c. as above. Increased by cuttings or division.

Tribe VIII. SENECIONOIDEÆ.—Leaves alternate, rarely opposite. Disc florets yellow, rarely blue. Achenes various. Pappus bristly.

TUSSILAGO (COLTSFOOT). — The only species belonging to this genus is a British herb *T. Farfara*, which has large broadly heart-shaped, angled, lobed or toothed cobwebby leaves, and heads of bright yellow flowers. The variegated variety is useful for growing in damp shady places, but it quickly overruns the ground by means of its creeping roots. It must therefore be checked from getting among choicer plants.

PETASITES.—A genus containing about a dozen species of rather white downy or woolly herbs with perennial rhizomes or stems, and often large, heart-shaped or reniform leaves. Flower-heads purple or white, in racemes or clustered panicles at the top of the scapes. Involucre bell-shaped or cylindrical. Receptacle flat, naked.

P. fragrans (*Nardosmia fragrans*; *Tussilago fragrans*).—*Winter Heliotrope.* A native of S.W. Europe and naturalised in parts of Britain. It is about 6–12 in. high, with roundish, toothed leaves, lobed at the base. Flowers in January and February, white or pale lilac, fragrant; scales of the involucre acute.

Other species of Petasites sometimes cultivated are *P. niveus*, the young leaves of which are silvery-white beneath, and the flowers, white or pale rose, are produced in March or April; and *P. officinalis*, the well-known Butter-bur of our wet meadows and pastures. It produces its rosy flowers from March to May, and thus succeeds those of the other species.

Culture and Propagation. — These plants being of vigorous and rather coarse growth are best for rough banks or wild parts, in ordinary soil. Their charm consists in blooming in the depth of winter and early spring. They may be increased by division after flowering.

ARNICA. — A genus of about 10 species of perennial herbs with clustered opposite, entire or toothed leaves, and yellow flowers on long stalks. Involucre more or less bell-shaped. Receptacle flat, naked, or often hairy. Achenes rather hairy.

Culture and Propagation. — Arnicas thrive in a mixture of loam, peat, and sand. They may be increased by dividing the roots in spring. Or seeds if they can be procured may be sown in a cold frame at the same period, afterwards transplanting the seedlings in May.

A. Chamissonis.—A pretty N. American species 1–2 ft. high, with oblong lance-shaped, pointed, or acute, woolly leaves. Flowers from July to September, 1½–2 inches across, yellow, corymbose.

Culture &c. as above.

A. montana (*Mountain Tobacco*).—A handsome tufted European species about 1 ft. high, with smooth oblong lance-shaped entire leaves. Flowers in July. 2 in. across, yellow, 3–4 together on hairy stalks.

Culture and Propagation.—This is an excellent rock plant, but as it does not grow freely can only be increased slowly by division, and by seeds when procurable. It should be planted in peaty soil with a little sand, in a position facing north.

The United States species, *A. foliosa*, is closely related to *A. montana*, but is somewhat taller, and has smaller pale yellow flowers about 1 in. across. It requires to be grown in a moist soil.

DORONICUM (Leopard's Bane).—A genus with about 12 species of smooth or glandular hairy perennial herbs, with alternate stalked leaves, and large yellow flowers, on long stalks. Involucre broadly bell-shaped, or hemispherical. Receptacle hemispherical, naked. Disc florets hermaphrodite, with pappus hairs in many series; ray florets, female without pappus, or 1–3 hairs.

Culture and Propagation.—Doronicums grow luxuriantly in a rich and rather heavy loamy soil, but also do well in ordinary garden soil. They are increased in early autumn or after flowering is over by dividing the roots. Also by seeds sown in spring in cold frames, afterwards pricking the seedlings out when large enough to handle easily, and eventually transferring to their flowering positions not later than the end of September, and during dull showery weather. Grown in masses they make effective border plants.

D. altaicum.—A Siberian species about 1 ft. high, with obovate toothed stem-clasping leaves and yellow heads of flowers in July.

Culture &c. as above. Increased by division in early autumn.

D. austriacum.—A somewhat hairy Austrian perennial 1–1½ ft. high. Lower leaves heart-shaped, stalked, toothed, passing upwards into ovate spoon-shaped and lance-shaped, amplexicaul bracts. Flowers in spring and early summer, large, yellow, 1–5 on a stem.

Culture &c. as above. Increased by division in early autumn.

D. caucasicum.—A showy Caucasian perennial 1 ft. or more high, with ovate heart-shaped, toothed leaves, and yellow flowers 2 in. across in spring,

Culture &c. as above. Increased by division in early autumn.

D. Clusi (*Arnica Clusi*).—A native of Switzerland 1–2 ft. high with downy stems and leaves. Lower leaves more or less oblong, blunt, narrowed into a stalk; upper ones lance-shaped, sessile, stem-clasping, toothed towards the base. Flowers in early summer, yellow, about 2 in. across on long softly hairy stalks.

Culture &c. as above. Easily increased by division in early autumn.

D. pardalianches (*Great Leopard's Bane*).—A European species 1½–3 ft. high, reputed to be poisonous. Leaves heart-shaped toothed, lower ones stalked; upper ones sessile, stem-clasping. Flowers in spring and early summer, yellow, usually 3–5 on a stem.

Culture &c. as above. Easily increased by division in early autumn.

D. plantagineum.—A strong-growing European species 1½–3 ft. high, with lower leaves ovate, stalked, unevenly toothed; upper ones nearly entire lance-shaped, sessile. Flowers in spring, yellow, usually solitary, on a long stalk. The variety *excelsum* (or *Harpur Crewe*) is a far superior garden plant to the type or any other species. It grows about 5 ft. high, with broadly heart-shaped, coarsely toothed leaves, and yellow flowers 3–4 in. across.

Culture &c. as above. Easily increased by division in early autumn.

Other species occasionally seen are *D. Columnæ* with downy toothed rather kidney-shaped leaves, and large yellow flowers; and *D. scorpioides* (Aronicum scorpioides) with long-stalked oval leaves and one to three large yellow flowers on a stem.

SENECIO (Groundsel; Ragweed). A large genus with about 900 species, now including many genera which were formerly considered distinct. They consist of annual, biennial or perennial bushes, shrubs, rarely trees, smooth or woolly, various in habit, and having alternate radical, entire, toothed, lobed, or often variously and pinnately cut leaves. Flower-heads various in size and colour, solitary or corymbose, rarely in pyramidal panicles, or subramose or sessile at the sides of the branches. Involucre cylindrical bell-shaped or nearly hemispherical. Ray florets sometimes absent as in the common Groundsel (*S. vulgaris*). Achenes smooth or slightly hairy. Pappus silky white.

Culture and Propagation. — Most of the Senecios are coarse and often troublesome weeds. The few kinds mentioned below are more or less worthy of a place in the garden. They are easily grown in any fairly good loamy soil and most of them like plenty of sun, while a few like *S. japonicus* and *S. sarracenicus* like to grow near water. They are all easily raised from seeds sown in spring, and the perennial kinds may also be divided at the root at the same period. Cuttings of the young fleshy shoots in a shaded frame will also root in spring and early summer if inserted in sandy soil, and kept shaded from strong sunshine; and cuttings of the roots themselves may sometimes be used to increase the stock.

S. argenteus. — A beautiful Chilian bush 1–2 ft. high, with silvery linear entire leaves 1½ in. long and branching stems. Flowers in summer, yellowish, solitary.

Culture and Propagation. — Often grown in greenhouses, but quite hardy in most parts of the country. It likes sandy well-drained loam either in the border or rockery and may be increased by cuttings as stated above.

S. artemisiæfolius.—A pretty perennial 1–1½ ft. high, with deep green finely divided feathery leaves, and clusters of showy yellow flowers in summer. Suitable for the rockery or border.

Culture &c. as above.

S. Cineraria. — This beautiful half-shrubby perennial 1½–2½ ft. high, native of S. France, is best known as *Cineraria maritima.* It is remarkable for its white silvery appearance, and leaves pinnately cut into from 4 to 6 pairs of oblong, blunt, 3-lobed segments. Flowers late in summer, yellow, in panicled corymbs. The variety *candidissima* has far whiter foliage than the type, and is a better plant.

Culture and Propagation. — This is excellent for the edges of borders or shrubberies, or around masses of shrubs or flowers on grass. It is easily raised from seed sown in gentle heat in early spring and planted out at the end of May. Cuttings may also be taken in the autumn and wintered in a cold frame or greenhouse until the following season.

S. concolor. — A pretty S. African perennial 1–2 ft. high, with narrow oblanceolate toothed leaves 4–6 in. long, narrowed into a stalk at the base. The flower-heads about 1¼ in. across appear in July, and are borne in loose corymbs on round striped stems furnished with broadly linear stem-clasping leaves. The ray florets, which are 12–14 in number, are mauve-purple, while those of the disc are white—one of the most distinct features of the plant.

Culture &c. as above. This species is probably too tender to stand the winter out of doors except in the mildest parts of the kingdom.

S. Doria. — A bold and handsome perennial 4–6 ft. high, native of S. Europe. Leaves ovate lance-shaped, 8–12 in. long, stem-clasping, leathery, minutely toothed, gradually becoming smaller all up the stem to the clusters of yellow flowers which appear in July and August.

Culture &c. as above.

S. Doronicum. — A showy perennial 1–3 ft. high, native of Central Europe. Lower leaves ovate heart-shaped or lance-shaped elliptic, leathery, toothed. Flowers in summer, bright yellow, 2 in. across.

Culture &c. as above.

S. elegans. — A beautiful S. African half-hardy annual 1–2 ft. high, with rather clammy and downy stems and leaves, the latter 1½–3 in. long, lobed at the base, variously shaped and cut. Flowers from July to October; ray florets purple, disc yellow. There is a dwarf variety *nana* about 1 ft. high, and also forms with white, deep crimson, lilac, rose and magenta, flowers all worth growing. The Double Pompon varieties have double flowers of shades mentioned.

Culture and Propagation. — Grown in masses, the varieties of *S. elegans* are effective in the flower border, their gay flowers being well set off by their abundant deep green foliage. They like a rich sandy loam, the richer the better.

Seeds may be sown to secure a succession at intervals in April and May in the open border, thinning the seedlings out 12 or 18 in. apart, or they may be sown earlier in heat and transplanted in June. Seeds may also be sown in cold frames about September and protected during the winter months, as much light and air as possible however being given on all favourable occasions. The double varieties may be struck from cuttings in autumn, and wintered in frames or cold greenhouses.

S. incanus.—A hoary-looking, tufted perennial of S. France, 3–6 in. high, with bright silvery incised leaves. Flowers in August, yellow, in somewhat crowded corymbs.

Culture &c. as above. Useful for the rockery in well-drained, sandy soil. Increased by division in spring. *S. uniflorus* from the Alps is closely allied.

S. japonicus (*Ligularia japonica; Erythrochæte palmatifida*). — A fine Japanese perennial about 5 ft. high, with smooth, green leaves about 1 ft. across, and deeply and palmately cut into unequally toothed lobes. Flowers in autumn, about 3 in. across, deep orange-yellow.

Culture &c. as above. A good plant for the margins of lakes, streams &c. Increased by dividing the roots in early spring.

S. Kæmpferi aureo-maculata (*Farfugium grande*). — A distinct Japanese perennial having thick fleshy stems 1–2 ft. high, with broad, roundish, heart-shaped, deep green leaves, conspicuously blotched with deep yellow in some forms, or white or rose in others.

Culture and Propagation. — This ornamental plant flourishes only in the mildest parts of the country, growing slowly in colder parts. It prefers slight shade and damp peaty soil and may be increased by separating the growths in spring, and keeping them in a close frame until established.

S. lagopus.—A New Zealand rock plant 6–12 in. high, with broadly elliptic blunt radical leaves, hairy above, densely woolly beneath. The bright yellow starry flower-heads, about an inch across, are borne in loose clusters in summer.

Culture &c. as above.

S. laxifolius.—A pretty bush 1½–3 ft. high, native of New Zealand, with very thick and leathery oblong lance-shaped leaves, densely crowded and covered with a grey down. Flowers in summer, about 1 in. across, golden-yellow, with a darker yellow disc and a woolly involucre, borne in profusion on panicles well above the foliage.

Culture &c. as above. This fine species is also known in gardens as *S. Grayi* and *S. latifolius*. It may be increased by cuttings of the young shoots inserted in sandy soil under handlights.

S. macrophyllus (*Ligularia macrophylla*). — A vigorous Caucasian perennial about 3–6 ft. high, with large, glaucous, oval lance-shaped, coarsely toothed leaves 3–4 ft. long, 1 ft. wide, with a whitish broad midrib. Flowers from June to August, golden-yellow, in very tall terminal spikes.

Culture and Propagation.—An excellent plant for wild grassy places, or the edges of lakes or streams, on account of its fine, rather glaucous foliage. It may be increased by dividing the roots in autumn or spring; or from seeds sown in gentle heat in spring, and pricking out the seedlings in the usual way, afterwards transferring to the open air in mild showery weather when sturdy enough.

S. pulcher.—A really beautiful perennial 2–3 ft. high, native of Buenos Ayres. Lower leaves stalked, oval, crenulate, passing upwards into smaller and more or less deeply toothed leaves. Flowers in September and October and even later in mild seasons, 2–3 in. across, beautiful rose-purple with a yellow disc.

Culture and Propagation.—*S. pulcher* likes a moist sandy loam. It does not often ripen seeds in this country, but may be increased by careful division of the roots in spring, or by root cuttings. The latter are cut into pieces about 2 in. long, and slightly covered with sandy soil. They are put in cold frames or greenhouses, and as the shoots appear, the new plants may be potted off singly, and kept shaded and close until they begin to get established. Afterwards they may be given plenty of light and air, and when sturdy enough may be transferred to the open border and grown in bold masses for effect.

S. sagittifolius. — A stately perennial native of Uruguay. It has tufts of large oblong wedge-shaped leaves about a yard long, and nearly 18 in. wide in the broadest part; the surface is covered with white down, the stalks are broadly winged, and the base is deeply sagittate, while the edges are also lobed. But the most remarkable feature of the leaves consists in the two conspicuous wavy crests, which are 1-2 in. deep and stand erect on the surface like thin plates of leafy tissue, and extend from the base beyond the middle of the leaf. The stout flower stalk rises from the centre and attains a height of 3–7 ft., being furnished with stalkless lance-shaped leaves, much smaller than the lower ones, and ending in a loose cluster of creamy white flower-heads each over an inch across.

Culture and Propagation.—In the milder parts of the country this species has proved fairly hardy, but it will naturally attain its finest proportions in the mildest parts of the south and west. In the event of severe winters the crowns may be protected with a covering of dry leaves. Owing to its noble aspect and distinct appearance it would prove very valuable for giving a sub-tropical aspect to the garden, and may be grown in masses on grassland or by the sides of streams, lakes &c., like *S. macrophyllus.* It may be increased by division of the roots in spring.

S. sarracenicus.—A showy perennial 4–5 ft. high, native of Europe, with thick, purplish, hairy stems, and deep green, stem-clasping, crenate-toothed, ovate lance-shaped, acute leaves 6–8 in. long, becoming gradually smaller upwards. Flowers in July and August, yellow, in branched panicles.

Culture &c. as above for *S. macrophyllus.*

S. sibiricus (*Ligularia sibirica*).—A downy Siberian perennial about 3 ft. high. Lower leaves long-stalked, heart-shaped, crenate, the upper ones smaller and sessile. Flowers from June to August, deep yellow, clustered on a tall stem. A plant for semi-wild parts of the garden.

Culture &c. as above. Increased by division of the roots or seed.

S. speciosus.—A handsome S. African perennial having a thick fleshy rootstock and rosettes of oblong lance-shaped clammy leaves 4-6 in. long, pinnately divided into blunt sinuate or crenate lobes. The beautiful bright purple flower-heads, over 1½ in. across, appear in July and August and are borne in loose clusters on the top of stalks about a foot high, and furnished with a few small lance-shaped stalkless leaves or bracts.

Culture &c. as above for *S. pulcher.*

OTHONNOPSIS.—A genus of smooth shrubs with alternate, stalkless, fleshy, and more or less slightly toothed leaves, and yellow flower-heads, in which the disc florets are usually sterile.

O. cheirifolia (*Othonna cheirifolia*). A pretty trailing perennial 9-12 in. high, native of N. Africa, forming greyish-green tufts on the surface of the soil. Leaves oblanceolate, thickish. Flowers in May and June, bright yellow, about 1½ in. across, borne singly at the ends of the shoots.

Culture and Propagation.—This is the only species of the 8 known that has any claim to garden value. It forms attractive patches in the border or rock garden, and flourishes in light dryish soils exposed fully to the sun. In cold wet winters it is apt to perish unless protected by a handlight or a sheet of glass. It may be increased by inserting cuttings of the non-flowering side and basal shoots in cold frames in autumn, and also by dividing the roots in spring.

Tribe IX. CALENDULACEÆ.—Leaves mostly alternate or radical. Achenes smooth, rarely woolly. Involucrate bracts in 1-2 rows. Receptacle naked. Flowers rayed.

DIMORPHOTHECA (CAPE MARIGOLD).—A genus containing about 20 species of smooth, downy, or glandular hairy, annual herbs or perennial bushes, with entire toothed or incised, often narrow leaves. Flower-heads on long stalks. Achenes smooth. Involucre broad. Disc flat or somewhat convex, naked. All natives of S. Africa.

Culture and Propagation.—Except perhaps in the mildest parts these plants will not grow outside during the winter. They like a well-drained sandy loam and sunny positions. The annual kinds may be raised from seeds sown in early spring, in heat, and transplanted in May. The perennials may also be raised in the same way, and also by cuttings in late summer and autumn, and wintered in a frame or greenhouse until the end of May. They are somewhat straggling in habit with more or less prostrate stems ascending at the ends, each of which bears a large Marguerite-like flower. They are useful for the front of borders or shrubberies, and should be grown in rather large patches to secure a good effect.

D. annua (*Calendula pluvialis*).—*Cape Marigold.*—A straggling green and purple stemmed annual about 6–18 in. high, with narrow oblong obovate sinuately lobed leaves 2–3 in. long, and masses of flowers 2–3 in. across in July, pure white inside, dull purple outside, with a yellow centre. They open well only in fine weather, closing during rain and early in the afternoon. There is a double-flowered form called *flore pleno.*

Culture &c. as above.

D. Ecklonis.—A pretty species 1–1½ ft. high, with oblong lance-shaped leaves 4–6 in. long, with a few large, irregular, triangular teeth on the margins. Flowers in June and July, pure white within, dull purple outside, about 3 in. across, opening only in bright sunny weather; when closed the ray florets are spirally twisted.

Culture &c. as above.

CALENDULA (MARIGOLD). — A genus with about 20 species of annual or perennial, somewhat downy herbs with alternate entire or sinuate toothed leaves. Involucre broad. Disc flat, naked. Pappus none.

C. officinalis. — A showy strong-smelling annual native of S. Europe, 9–12 in. high, with oblong sessile ciliated leaves. Flowers in summer and autumn, orange-yellow, with a darker centre. The varieties mentioned below, as well as *La Reine* and *Le Proust*, are all fine double ones. The variety ***prolifera*** is a ***Hen-and-Chickens*** form, in which 8 or 9 smaller single flower-heads radiate from the base of a larger central double flower.

Culture and Propagation.—Everyone knows how easily grown the Common Garden Marigold is. The seeds are sown in April or May, in any ordinary soil in sunny or half-shady places. They germinate freely and may be thinned out about 1 ft. apart. Year after year they will appear with regularity, and in ever-increasing masses unless thinned out. The choicer varieties, like ***Meteor***, ***Orange Cockade***, and ***Orange King***, are improvements upon the common form described above. For French and African Marigolds, see *Tagetes* (p. 525).

C. suffruticosa. — A bushy Algerian annual, softly downy and with a somewhat straggling habit. Leaves narrow, almost entire. Flowers smaller than those of the ordinary Marigold, but very numerous, and bright yellow.

Culture &c. as above for *C. officinalis.*

Tribe X. ARCTOTIDEÆ.—Leaves radical or alternate. Achenes often fleshy, smooth or with a chaffy pappus. Bracts of the involucre in many rows, often scarious or spinescent at the apex. Disc naked, chaffy, pitted or hollowed. Flowers rayed.

URSINIA (SPHENOGYNE).—A genus containing over 50 species of smooth or rarely downy annual or perennial herbs or bushes. Leaves alternate, serrate, pinnatifid, or often pinnately dissected. Flower-heads at the ends of the branches usually long-stalked, solitary, or in loose panicles. Involucre hemispherical, or broadly bell-shaped. Disc flat or convex, chaffy.

Culture and Propagation.—Ursinias grow in any ordinary light soil, and are useful in masses in borders or beds in sunny places. The kinds mentioned below are best treated as half-hardy annuals, and may be raised from seeds sown in gentle heat about February or March, and planted out at the beginning of June, 12–18 in. apart.

Seedlings from seeds sown in September may be wintered in cold frames or greenhouses, but they are scarcely worth 6 months' care.

U. anthemoides (*Arctotis anthemoides*).—A S. African annual 3–12 in. high, with finely divided leaves and yellow Marguerite-like flowers in August, the ray florets being tinged with purple outside.

Culture &c. as above.

U. pulchra (*Sphenogyne speciosa*).—A pretty annual, probably native of S. Africa, 9–18 in. high. Leaves sessile, pinnate, with linear acute segments. Flowers in summer, 2–3 in. across, bright yellow, with a deep purple-black zone at the base of the lance-shaped ray florets. The variety ***aurea*** has a wholly yellow centre, and there is also a pale sulphur coloured form called ***sulphurea.***

Culture &c. as above.

HAPLOCARPHA.—A small genus of almost stemless perennials with radical entire or toothed leaves covered with hoary wool or down on the under surface.

Flower-heads yellow, solitary; involucre hemispherical with numerous bracts. Receptacle flat or convex. Ray florets entire or minutely 8-toothed.

H. Leichtlini (*Gorteria acaulis*). — A pretty S. African plant with lyrate pinnately cut leaves 6–9 in. long and 2–8 in. broad. Flowers in summer, 2 in. or more across, with free involucral bracts, the outer ones woolly, the inner ones purplish. Ray florets yellow tinged with purple beneath, and surrounding a deeper yellow centre or disc.

Culture and Propagation. — This species flourishes in light sandy soil in sheltered sunny positions and may be used in the rock garden or border grown in bold masses. It requires protection in winter from cold heavy rains, and may be increased by inserting cuttings of the basal shoots in cold frames in late summer and autumn.

H. scaposa.—A distinct whitish-looking plant about 18 in. high, also native of S. Africa. The flower-heads are produced singly on downy stalks in August and September, and sometimes last well into October. The ray-florets are golden-yellow, as is also the disc, although perhaps of a deeper shade.

Culture &c. as above for *H. Leichtlini.*

ARCTOTIS. — A genus with 80 species of more or less stemless, woolly or hoary herbaceous perennials, with radical or alternate, entire, sinuate-toothed, or pinnately dissected leaves. Flower-heads on long stalks. Involucre hemispherical, with bracts in many rows. Disc flat or slightly convex, pitted, studded with bristles between the florets. Achenes grooved. Pappus consisting of chaffy scales.

Culture and Propagation. — These plants love the sun but thrive also in partially shaded spots, in a mixture of good sandy loam and leafsoil. They may be increased by cuttings taken from the side shoots whenever obtainable up to about the end of July, and stuck in very sandy soil in a cold airy frame; also by seeds sown in cold frames or in gentle heat in spring. The plants must, however, be protected under glass from the end of October to June, but between those months may be used with great effect in the flower borders in the same way as other 'bedding' plants. In the mildest parts of the kingdom some kinds have proved to be perfectly hardy even in winter. The kinds described below are all natives of S. Africa.

A. acaulis.—An almost stemless decumbent plant about 4 in. high, with hoary ternate lyrate leaves and large rich orange flowers in summer.

Culture &c. as above.

A. arborescens. — A bushy species about 2 ft. high. Leaves linear-oblong, pinnate; lower ones stalked, upper sessile, stem-clasping. Flowers in summer, over 2 in. across, ray florets white above, pink beneath, surrounding a yellow disc.

Culture &c. as above.

A. grandiflora (*A. aureola*).—A showy plant about 1½ ft. high, with pinnately cut serrulate leaves. Flowers in July, bright orange, with a somewhat cobwebby involucre.

Culture &c. as above.

A. leptorhiza.—A fine annual, a foot or so high, with divided leaves and an abundance of rich orange flowers in summer. Seeds may be sown in April in the open border where the plants are to bloom.

Culture &c. as above.

A. speciosa (*A. breviscapa*).—A stemless species about 1½ ft. high, near *A. acaulis*, with hoary pinnately cut lyrate leaves and yellow flowers in July.

Culture &c. as above.

VENIDIUM. — A genus with 18 species of half-hardy more or less woolly perennials, similar to *Arctotis* in flowers and habit, and cultivated in the same way. All natives of S. Africa.

V. calendulaceum.—A showy perennial 6–12 in. high. Lower leaves stalked lyrate, the terminal lobe being much larger than the other and more or less rounded and bluntly toothed; all smooth and green above, white beneath. Flowers from July to October, very similar to those of the ordinary Marigold (*Calendula officinalis*), bright yellow, with a dark brown or almost black centre.

Culture and Propagation.—Although really a perennial it is on the whole best to treat this plant as an annual. It flourishes in ordinary good garden soil, and may be used with advantage for the fronts of flower borders or for making a carpet beneath taller plants. Seeds may be sown in gentle heat in March, and the seedlings will be ready for the open air by the end of May. They may also be sown in the open border where the plants are to bloom during April and May. To obtain large plants for early flowering the seeds may also be sown as soon as ripe in cold frames. The seedlings should be pricked out when large enough, and should be protected in cold frames or greenhouses during the winter, giving as much light and air as possible on all favourable occasions. By potting the plants on and encouraging growth strong plants will be ready for the open border in May, and very often they flower much better than plants raised from seeds at other periods. Other species are *V. fugax*, about 18 in. high, with radical elliptic leaves and bright orange-red flowers; and *V. hirsutum*, 9–12 in. high, with lyrate pinnatifid leaves and bright orange-red flowers with a blackish centre.

GAZANIA (Treasure Flower).—A genus containing 24 species of showy, somewhat stemless, more or less hoary or woolly annual or perennial herbs, with radical or alternate entire or pinnately cut leaves. Flower-heads on long stalks. Involucre urn-shaped, rarely broad, with bracts in many rows. Disc flat or convex, slightly pitted. Achenes densely covered with long hairs. Pappus with numerous linear scales. All the species are natives of S. Africa.

Culture and Propagation.—Gazanias thrive in a mixture of sandy loam and peat, and are most effective in warm sunny corners of the flower border. About July and August cuttings of the lower side shoots will root freely in a cold frame in sandy soil, and the plants must be kept under glass protection until the following June. Plenty of air must be given on all favourable occasions, and only just enough heat to keep the frost out, otherwise the plants are apt to grow weedy and delicate.

G. Pavonia. — A beautiful species about 1½ ft. high, with hairy pinnately cut leaves, and large, handsome yellow flowers in July; ray florets with a brown spot at the base, or a white one in the middle. Disc dark.

Culture &c. as above.

G. rigens.—A species about 1 ft. high with linear spoon-shaped hairy leaves and bright yellow flowers in June, with a dark velvety zone at the base.

Culture &c. as above.

G. splendens.—This beautiful plant is supposed to be a hybrid, probably between *G. rigens* and *G. uniflora.* It grows about 1½ ft. high, with linear spoon-shaped leaves, white beneath, and bright orange flowers in summer, with a black and white spot at the base of the ray florets. There is a form with yellow variegated leaves.

Culture &c. as above.

G. uniflora.—A shrubby species about 1 ft. high, with somewhat decumbent stems and spoon-shaped lanceolate leaves, downy beneath. Flowers in July and August, wholly yellow.

Culture &c. as above.

BERKHEYA.—A rather large genus of more or less Thistle-like herbs or bushes with alternate or rarely opposite radical leaves, sometimes decurrent, toothed, pinnately divided or cut, and having spiny teeth or lobes. The yellow or purple flower-heads are either solitary or in small clusters.

B. purpurea (*Stobæa purpurea*).—An attractive S. African perennial 2–3 ft. high, with spiny Thistle-like leaves about 9 in. long towards the base of the stems, somewhat clammy above and greyish or downy beneath. The beautiful flower-heads, 2½–3 in. across, appear in late summer in loose clusters, and have lilac-purple strap-shaped ray-florets surrounding a deeper purple centre.

Culture and Propagation.—Out of about 70 species the above appears to be the only one of any value for the outdoor flower garden. It flourishes in any good and well-drained sandy soil, but prefers a rich sandy loam and open sunny positions sheltered from the north and east. It may be increased by detaching the suckers or underground shoots in spring as they are just beginning to push through the surface of the soil. Seeds are ripened in ordinary good seasons and should be sown in cold frames when mature, afterwards transferring the seedlings to the open air the following spring when danger from frost is past.

Tribe XI. CYNAROIDEÆ.—Leaves alternate, often spiny. Florets usually all tubular. Bracts of the involucre in many rows, usually imbricated and more or less prickly. Disc often fleshy, with dense bristles or fimbriated scales. Achenes often hard. Pappus bristly or chaffy, rarely none.

ECHINOPS (GLOBE THISTLE).—A genus containing over 70 species of showy, vigorous, Thistle-like, more or less whitish-woolly biennials or perennials. Leaves pinnate-toothed, or once, twice, or thrice pinnately cut, with spiny lobes and teeth. Inflorescence remarkable for having the 1-flowered capitules in terminal globose clusters, resembling the flower-heads of most other genera in the order Compositæ. Florets white or blue, with an involucre of prickly scales and bristles.

Culture and Propagation.—The Globe Thistles are excellent and showy border plants, and thrive in ordinary garden soil. The perennials may be increased by dividing the roots in early spring, or by making root cuttings as in the case of *Senecio pulcher* (see p. 542); seeds may also be sown under glass in autumn or spring as with the biennial kinds, and the seedlings will be ready for transplanting about the end of May.

E. bannaticus.—An Hungarian biennial 2–3 ft. high, with roughish downy pinnately cut and lobed leaves having spiny lobes. Flowers in summer, deep violet-blue, in round heads.

Culture &c. as above.

E. commutatus (*E. exaltatus*).—A vigorous Austrian perennial 5–7 ft. high, with roughish pinnately cut spiny leaves, hairy above, downy beneath. Flowers in summer, whitish or purplish, borne on hairy, cobwebby stems.

Culture &c. as above.

E. Ritro.—A pretty S. European perennial about 3 ft. high, with pinnately cut, but not spiny leaves, webbed above, downy beneath. Flowers in summer, blue.

Culture &c. as above.

E. ruthenicus.—A fine species 3–5 ft. high, native of S. Russia, with whitish downy stems, and leathery leaves pinnately cut into toothed and spiny segments, green above, downy beneath. Flowers in summer, deep blue.

Culture &c. as above.

E. sphærocephalus.—A handsome species 2–4 ft. high, with striped branches and wavy pinnatifid spiny leaves, green and hairy above, white or woolly beneath. Flowers in summer, pale blue. The variety *giganteus* is more robust in habit with larger heads of flowers, and *albidus* has whitish flower-heads.

Culture &c. as above.

XERANTHEMUM.—A genus with 4 or 5 species of erect hoary annual 'Everlastings' having narrow entire leaves, and solitary long-stalked flower-heads at the tips of the branches. Involucre bell-shaped or cylindrical, with many chaffy bracts, often coloured. Disc flat, chaffy. Pappus bristly.

X. annuum (*X. radiatum*).—A beautiful S. European 'Everlasting' about 2 ft. high, with whitish woolly branches and leaves, and white, purple, yellow, or violet flowers. There are many colour varieties, the principal being, *album*, white; *imperiale*, dark violet-purple; *multiflora*, a compact-growing form with white, purple, or violet flowers; *superbissimum*, a pretty double form with various colours; *plenissimum*, dark purple double; *Tom Thumb*, somewhat like *multiflora*, &c.

Culture and Propagation.—These 'Everlastings' may be sown in the open border in April in ordinary soil. The flowers are borne in profusion and are excellent for cutting. They may be dried head downwards in a cool airy place for winter decoration like the *Helichrysums* (p. 503).

CARLINA (CHARLEMAGNE'S THISTLE). This genus contains about 14 species of rather stemless or erect dwarfish perennial herbs, rarely shrubs, with toothed or pinnately cut and divided spiny leaves. Flower-heads sessile among the lower leaves, or solitary at the apex of the branches, or in corymbs. Involucre broadly bell-shaped, with many imbricated bracts. Disc flat, fleshy, with chaffy scales. Pappus feathery.

Culture and Propagation.—Carlinas are worth growing, and are suitable for edges of shrubberies, woodland walks, or on warm sunny banks in ordinary soil. They may be easily raised from seed sown in April in the open border, or may be divided in early autumn or spring.

C. acanthifolia.—A stemless perennial about 2 ft. high, native of S. Europe. Leaves downy beneath, pinnately cut into toothed angular and spiny segments. Flowers in June, white or yellow.

Culture &c. as above.

C. acaulis. — A European perennial about 9 in. high. Leaves pinnately cut into toothed spiny segments. Flowers in June, white.

Culture &c. as above.

C. biebersteiniana, about 2 ft. high, from the Caucasus, has purple flowers in August.

Culture &c. as above.

CNICUS (including CHAMPÆPEUCE). This genus contains about 200 species of annual, biennial, or perennial herbs, with serrate or pinnately toothed and lobed spiny leaves, often decurrent with the stem. Involucre ovoid or globose, with spiny bracts in many rows. Disc hairy. Pappus deciduous, feathery.

Culture and Propagation. — These Thistle-like plants grow almost anywhere in rough soil and may be used for rough parts of the garden. They are easily raised from seeds sown in spring in the open border, or earlier in gentle heat, afterwards pricking the seedlings out preparatory to transferring to the open air about May. The tufts may also be divided in autumn or spring.

C. acaulis.—A British and European perennial about 2 ft. high, with stalked lance-shaped pinnately cut spiny leaves, and purple flowers in summer.

Culture &c. as above.

C. altissimus (*Cirsium altissimum*). A native of the United States 8–10 ft. high, with leaves downy beneath, oblong lance-shaped, toothed above, pinnately cut below. Flowers in August, purple.

Culture &c. as above.

C. Casabonæ (*Chamæpeuce Casabonæ*).—*Fishbone Thistle.*—A native of S. Europe 2–3 ft. high, with deep green spiny leaves veined with white. Flowers in summer, pale purple.

This species and the next one (*C. diacantha*) are very picturesque grown in masses, and may be used to ornament the rockery. Young plants raised from seed in autumn are sometimes grown in pots for conservatory decoration, owing to their attractive appearance.

Culture &c. as above.

C. Diacantha (*Chamæpeuce Diacantha*).—A Syrian perennial 2–3 ft. high. Leaves shining green, with silvery veins and ivory-white spines. Flowers in summer, purplish, in dense spike-like clusters.

Culture &c. as above.

C. spinosissimus.—A European perennial about 3 ft. high, with downy stem-clasping, pinnately cut and toothed, spiny leaves. Flowers from June to August, pale yellow, in terminal clusters.

Culture &c. as above.

C. undulatus (*C. Douglasi*).—A Californian perennial, 1 ft. high. Leaves more or less spiny, pinnately cut, the side and terminal lobes elongated. Flowers in summer, purple, in corymbs, scarcely rising above the leaves.

Culture &c. as above.

ONOPORDON (COTTON THISTLE).—A genus with 12 species of more or less woolly annual, biennial, or perennial Thistle-like herbs. Involucre roundish or broad. Receptacle flat, fleshy. Achenes smooth.

Culture and Propagation.—The Cotton Thistles have a noble appearance and may be used in many ways in the border or shrubbery, or for sub-tropical gardening. They thrive in ordinary soil, and may be increased by seeds sown in fairly rich soil in early autumn or spring in the open border. The seedlings may be thinned out, leaving some to flower where the seeds were sown, and transplanting the others if necessary. They require to be treated in the same way as biennials in general (see p. 78).

O. Acanthium.—A stately British and European perennial 4–8 ft. high, with woolly stems and leaves, the latter decurrent, more or less oblong-ovate, sinuate-pinnatifid, spiny. Flowers from July to September, purple, 1½–2 in. across, with a very cobwebby involucre, and awl-shaped, spiny, recurved green bracts.

Culture &c. as above.

O. arabicum.—A S. European biennial, 8–10 ft. high, with whitish woolly stems and leaves, and heads of purple flowers in summer.

Culture &c. as above.

O. illyricum (*O. horridum*).—A handsome biennial 6 ft. high or more, native of S. Europe, and resembling *O. Acanthium* in appearance. Its oblong lance-shaped leaves, however, are greener, more deeply cut and spiny. Flowers in July, purple.

Culture &c. as above.

O. macracanthum.—A striking annual about 6 ft. high, native of Barbary, with cobwebby stems. Leaves narrow oblong lance-shaped pointed, spiny-toothed, smooth above, cobwebby beneath. Flowers in July, purple, with a woolly involucre.

Culture &c. as above.

SILYBUM.—A genus having one or two species of smooth perennial Thistle-like herbs, with divided spiny leaves, and solitary nodding flower-heads. Involucre broad, roundish, with rigid spiny bracts. Disc flat, densely bristly. Achenes smooth. Pappus bristly.

S. marianum (*Our Lady's Milk Thistle*).—A native of S. Europe to Asia Minor 1–4 ft. high, with large sinuately lobed and pinnately cut spiny leaves blotched with white. Flowers from July to September, rose-purple, in round heads 1–2 in. across. (See *Carbenia benedicta*, p. 551.)

Culture and Propagation.—This interesting plant will grow in ordinary soil and may be used in borders, grassy places, or wild parts of the garden. The roots were formerly used as a pot herb in this country, where it is occasionally found wild. It is easily increased from seeds grown in spring or early autumn in the open border. As the foliage is usually regarded as the most ornamental feature of the plant, the flower-heads may be pinched off as they begin to show.

There is another species (Algerian) called *eburneum*, rarely seen. It has white blotched and more spiny leaves, but is not hardy except in the mildest parts. Being a biennial, seeds must be sown annually to keep up a supply, in the same way as *S. marianum*.

CENTAUREA (CENTAURY). — As many as 400 species of this genus have been described, but few are garden plants. They are annuals, biennials, or perennials with radical or alternate, entire or often toothed, incised, or once or twice pinnately cut leaves. Flower-heads solitary or paniculate. Florets all tubular. Involucre ovoid or round, with scarious, fringed, toothed, or spiny bracts. Disc bristly. Pappus short and bristly, rarely none.

Culture and Propagation. — The annual kinds (like the Blue Cornflower and Sweet Sultan) may be raised from seeds sown in the open ground in April or September and thinned out to 9 or 12 in. apart. The biennial kinds (like *C. Fenzli*) may be sown earlier in heat and planted out in May to flower the same year, or in September to flower early the following season. The perennial species may also be raised from seeds sown outside in April, and every second, third, or fourth year the rootstocks may be divided to further increase the stock. All the kinds flourish in ordinary good and well-drained garden soil, and when grown in masses look very ornamental.

C. alpina. — A perennial about 3 ft. high, native of S. and E. Europe, with spiny decurrent leaves, downy beneath. Flowers in July, yellow.

Culture &c. as above. Increased by seeds or division.

C. americana. — A downy N. American annual, about 3 ft. high, with oblong, membranous, entire leaves. Flowers in August, red or lilac-purple, 3 in. or more across. The variety *alba* has creamy white heads of flowers, the exserted stamens giving a yellowish tinge to the centre.

Culture &c. as above. Increased by seeds sown in spring and autumn either in the open ground or in gentle heat. In the latter case the seedlings must be pricked out and grown on until favourable weather in spring before they can be planted out.

C. atropurpurea.—A perennial about 3 ft. high, native of E. Europe. Leaves twice pinnately cut into lance-shaped segments. Flowers from June to August, dark purple. Bracts ovate lance-shaped serrate, fringed.

Culture &c. as above. Increased by seeds or division.

C. aurea.—A S. European perennial, about 2 ft. high, with hairy leaves; lower ones pinnately cut. Flowers from July to September, golden-yellow. Bracts spiny, spreading.

Culture &c. as above. Increased by seeds or division.

C. babylonica.—A perennial 6–10 ft. high or more, native of the Levant, with silvery lance-shaped ovate leaves, stalked and slightly toothed below, decurrent above. Flowers in July, yellow, small, arranged on the stems for a distance of 1½–2 ft.

Culture &c. as above. Increased by seeds or division.

C. Cineraria (*C. candidissima*).—A half-hardy perennial, 1–1½ ft. high, native of Italy, remarkable for its beautiful white appearance. Leaves once or twice pinnately cut. Flowers in July and August, purple or yellow, with ciliated involucres.

Culture and Propagation.—This species may be increased by cuttings taken in July, August or September, and inserted in close cold frames, in sharp, sandy, loamy soil, gently watering them in. In three or four weeks they will be well rooted, and may be potted up singly, and kept in a frame or greenhouse until the end of May, when they may be planted out. Seeds may also be sown at the same period, and the young plants treated like the rooted cuttings. The dense tufted habit of this plant renders it useful for making edgings and borders, or for white downy carpets beneath taller plants. The flower-heads are not particularly valued, and indeed they rarely appear, but should they do so, it is best to pick them off, as they detract from the ornamental effect of the foliage.

C. Clementei.—A pretty Spanish perennial 9–12 in. high, with fine rosettes of silvery-white foliage. The individual leaves are 6–8 in. long, pinnately cut into 3 or 4 strongly toothed lobes. From a garden point of view the purple flowers are of little use, and are best picked off so as not to detract from the beauty of the foliage.

Culture &c. as above. This species is excellent for edging borders or beds, and may be raised from seeds or cuttings in the same way as *C. Cineraria*.

C. Cyanus (*Blue-Bottle; Bluet; Cornflower*).—A charming native annual or biennial, 2–3 ft. high, with linear, entire, downy leaves; the lower ones often toothed. Flowers from June to September, bright blue, in heads ½–1 in. across, with a purplish centre. *Flore pleno* is a form with double flowers. *C. depressa*, about 1 ft. high, with deeper blue flowers, is very near *C. Cyanus*. It has rose and purple forms.

Culture and Propagation.—Seeds of the Cornflower are best sown when ripe, so that the seedlings will be strong and sturdy for the winter, and make better flowering plants the following year than if sown in April. They grow in ordinary soil, and in any fairly lightsome or fully exposed situation. They are useful for borders or groups, and the flowers are excellent for cutting. When grown in broad patches they look very charming when in blossom.

C. dealbata.—A graceful Caucasian perennial 1–1½ ft. high, with pinnate leaves, having coarsely toothed, obovate, or lance-shaped lobes, all covered with white hairs beneath. Flowers in summer, rosy.

Culture &c. as above. Increased by seeds or division.

C. Fenzli.—A pretty Armenian biennial about 4 ft. high, with beautiful large heart-shaped ovate glaucous leaves. Flowers in summer, canary-yellow, in large heads.

Culture &c. as above. Increased by seeds sown in spring or autumn in the open air, or in cold frames.

C. glastifolia.—A handsome Caucasian species, 4–6 ft. high, with lance-shaped leaves, and Thistle-like heads of yellow flowers in summer.

Culture &c. as above. Increased by division or seed.

C. gymnocarpa.—A bushy plant, about 2 ft. high, native of S. Europe. Leaves twice pinnate, prettily cut and divided, and densely covered with a white silky down. Flowers in small heads, rose, violet, or purple, in panicles, often hidden by the foliage. They are best suppressed. The variety *plumosa* differs from the type in having less white and more deeply cut leaves. It is useful for edging, and beautiful when grown as large single specimens.

Culture &c. the same as for *C. Cineraria* above.

C. macrocephala.—A vigorous Caucasian perennial 3–5 ft. high, with simple, roughish, oblong lance-shaped, pointed leaves, somewhat decurrent, serrated. Flowers in July, yellow, large, with jagged involucre bracts.

Culture &c. as above. Increased by division or seed.

C. montana.—A handsome Pyrenean perennial, 1–3 ft. high, with slightly cottony, lance-shaped, entire, decurrent leaves. Flowers in early summer, blue or lilac, large; florets deeply 4-5-cleft. There is a white variety *alba*, and a rosy one called *rosea*. Also others called *carnea*, *purpurea*, *rubra*, and *sulphurea*.

Culture &c. as above. Increased by division or seed.

C. moschata (*Amberboa moschata*).—*Sweet Sultan.*—A pretty Persian annual 1½-2 ft. high, with lyrate-toothed leaves, and roundish, long-stalked heads of violet-purple, more or less musk-scented flowers. There is a variety with white flowers.

Culture and Propagation.—Seeds of this annual may be sown at intervals from the beginning of April to the end of May, and the plants may be thinned out 9-12 in. apart. It does not succeed on wet or heavy soils, and is best sown in dry chalky, sunny spots (lime or brick rubble will supply the want), where it is to bloom.

C. ragusina.—A handsome half-hardy perennial, about 2 ft. high, native of S.E. Europe, with beautiful silvery-haired leaves, pinnately cut into ovate entire segments. Flowers in summer, yellow, in large heads, with fringed involucres.

Culture and Propagation. — This species requires similar treatment to *C. Cineraria.* Where large specimens are wanted, the old plants may be taken up in autumn, and wintered in a cool greenhouse until the end of May.

C. suaveolens (*Amberboa odorata*).—*Yellow Sweet Sultan.*—A pretty bright green annual, about 1½ ft. high, native of the Levant, with leaves pinnately cut into toothed lobes. Flowers in July, citron-yellow, fragrant.

Culture &c. as for *C. moschata* above.

Other species met with occasionally are *orientalis* (straw-yellow), *pulchra* (bright purple), *Phrygia* (violet-red), *ruthenica* (pale yellow), and *uniflora* (purple), but those described are best.

CARBENIA (Blessed Thistle).—A genus closely allied to *Cnicus* and *Centaurea*, and containing at present only one species.

C. benedicta (*Cnicus benedictus*).—A handsome hairy annual or biennial, native of S. Europe and N. Africa, with large deep green wavy leaves pinnately cut into spiny-toothed lobes, and blotched and marbled with white. Flowers yellow, in rather large ovoid-globose heads, the outer involucral bracts of which are leafy and spiny-toothed. (See *Silybum marianum*, p. 549.)

Culture and Propagation.—This plant is grown chiefly for its ornamental foliage and may be used with effect in borders. It likes rich loamy soil to grow luxuriantly, but will also succeed in rough soil. Seeds may be sown in April in the open, or in autumn, to make stronger plants the following season.

CARTHAMUS (Safflower). — A genus containing 20 species of rigid, smooth, glandular or somewhat woolly Thistle-like annuals, with alternate spiny-toothed and lobed leaves. Flower-heads at the tips of the branches or in corymb-like clusters. Involucre ovoid or roundish, with outer leafy and spiny-toothed bracts. Disc flat, with chaffy bristles. Achenes smooth, obovoid, 4-angled or flattened. Pappus chaffy, hairy, or none.

C. tinctorius (*Saffron Thistle*). — A showy Indian and Egyptian annual 2-3 ft. high, with stiff whitish stems, and lance-shaped, toothed, spiny leaves, veined with white. Flowers in July and August, deep orange and red, with florets usually hermaphrodite.

Culture and Propagation. — The Saffron Thistle thrives in light rich soil in sunny situations, and its remarkable flowers have a pleasing effect in beds or borders. Seeds may be sown in the open in April, where the plants are to bloom; or in March in gentle heat, the seedlings being transplanted to the border about the end of May. Other species not so well known but requiring the same treatment are *C. lanatus* and *C. arborescens*, both with yellow flower-heads.

Tribe XII. Mutisiaceæ.—Leaves radical or alternate, rarely opposite. Flower-heads heterogamous or homogamous, florets equal. Involucre bracts in many series, rarely spiny. Achenes various. Pappus bristly, chaffy, or none.

MUTISIA.—A genus with about 36 species of erect or climbing smooth or woolly shrubs. Leaves alternate. entire, pinnately divided or cut, the midrib often produced into a tendril. Flower-heads large, heterogamous, sometimes very long, solitary at the ends of the branches. Involucre ovoid-bell-shaped or oblong.

Disc flattish, naked. Achenes angled, top-shaped or oblong.

Culture and Propagation. — The species described below are more or less hardy in the milder parts of the British Islands, but they cannot always be successfully grown. They may be increased by cuttings in spring placed in sandy soil in a cold frame or greenhouse, and kept close until nearly rooted. The plants like a rich loamy soil, and seem to thrive best in sheltered airy places, facing west or south-west, trained against walls or trellises. Hot dry soils should be avoided if possible, or where such only are available a good quantity of well-rotted manure, leaf-soil, peat and other decayed organic matter may be added to give counteracting effects.

M. Clematis.—This fast-growing herbaceous climber, with stems 10–30 ft. long, is found in Colombia, Peru, and Ecuador at elevations ranging from 6000 to 11,000 ft. Leaves pinnate, with 7–9 pairs of leaflets, each ending in a branched tendril, and clothed with silky down beneath. Flower-heads large, bright red. Likely to be hardy only on the southern coasts in warm sheltered places.

Culture &c. as above.

M. decurrens.—A handsome climbing perennial, native of the Chilian Andes, with lance-shaped glaucous decurrent leaves, ending in a tendril. Flowers from June to August, 4–6 in. across, brilliant orange, with a yellow centre. Ray florets about ½ in. across. Involucre bluish-green tinged with purple.

Culture &c. as above.

M. ilicifolia.—A beautiful but tender Chilian climber with wiry cobwebby stems, and leathery spiny-toothed Holly-like leaves about 2 in. long, ending in a branched tendril. Flowers in summer, axillary, 3 in. across, pale pink or white, with a lemon-yellow centre.

Culture &c. as above.

M. latifolia. — A singular climbing shrub, native of Valparaiso, with leafy winged stems, and heart-shaped oblong spiny-toothed stalked leaves, woolly beneath. Flowers in autumn, pink and yellow.

Culture &c. as above.

GERBERA. — A genus containing about 20 species of almost stemless herbs, with a very short perennial rootstock. Leaves radical, entire, sinuate-pinnatifid, downy or woolly beneath. Scape erect with a solitary heterogamous flower-head. Involucre more or less broadly bell-shaped, with 2 or more rows of lance-shaped linear bracts. Disc flat, naked, or slightly pitted. Achenes more or less flattened, 5-ribbed, hairy. Pappus with copious bristles. *G. anandria* from Japan and *G. lanuginosa* from the Himalayas have been introduced to cultivation, but are practically unknown.

G. Jamesoni.—A beautiful plant 1–1½ ft. high, native of the Transvaal, with rosettes of dark green pinnately divided leaves, and solitary heads of glowing scarlet flowers 3 in. across with a yellow centre. Ray florets linear, strap-shaped acute.

Culture and Propagation. — This species can be considered hardy only in the very mildest parts of the country, but it has not yet been grown in any quantity out of doors, so that its behaviour cannot be recorded. It is usually grown as a cold greenhouse plant with plenty of light and air, and in a compost of sandy loam and peat. It may be raised from seeds sown in gentle heat in spring.

G. viridifolia.—An interesting but not nearly so showy a species as *G. Jamesoni*. It is a native of S. Africa and grows about a foot high. The lance-shaped entire leaves, with long stalks, are usually inverted, and the individual flower-heads are nearly 2 in. across. The ray florets are white above, and flushed with lilac beneath. The flowers unfortunately do not remain expanded all day, but close more or less about mid-day.

Culture &c. as above.

Tribe XIII. CICHORIACEÆ or LIGULIFLORÆ.—Leaves radical or alternate. Juice often milky. Flower-heads homogamous; florets all strap-shaped.

SCOLYMUS.—A genus with 3 species of smooth Thistle-like annuals, biennials or perennials with alternate pinnately cut and toothed spiny leaves. Flower-heads terminal or lateral, sessile. Involucre ovoid or roundish, with leathery spiny bracts. Disc conical or elongated.

Culture and Propagation. — The

species described below grow in ordinary soil, and may be increased by seeds sown in April and May where the plants are to grow. The perennial kind may be also increased from seeds and by dividing the roots in early autumn.

S. grandiflorus. — A hairy-stemmed perennial about 3 ft. high, native of the Mediterranean regions, with winged, decurrent and slightly hairy leaves. Flowers in May, yellow.

Culture &c. as above. Increased by seeds and division.

S. hispanicus (*Golden Thistle; Spanish Oyster Plant*).—A biennial about 3 ft. high, native of S.W. Europe. Leaves decurrent, smoothish, winged. Flowers in August, yellow, sometimes used to adulterate Saffron.

Culture &c. as above. Increased by seeds.

S. maculatus.—A S. European annual about 3 ft. high, with smooth stems and winged, decurrent, often white spotted leaves. Flower-heads yellow, in somewhat corymbose clusters.

Culture &c. as above. Increased by seeds.

CATANANCHE.—A genus with 5 species of rather downy or smooth annual or perennial herbs, with radical, clustered, linear entire or slightly toothed leaves. Flower-heads on long stalks, homogamous. Involucre oblong-conical or roundish. Disc flat with long bristles. Pappus with 5–7 bristly lacerate-toothed scales.

C. cærulea.—A beautiful S. European perennial 2–3 ft. high, with hoary narrow lance-shaped leaves, having one or two small teeth on each side. Flowers in July and August, light blue. The variety *alba* or *bicolor* has white flowers marked with blue or rose, at the base of the strap-shaped florets. *C. lutea* grows about 1 ft. high, and produces yellow flowers in June.

Culture and Propagation. — Catananches are good border plants and grow in any fairly good well-drained garden soil. They dislike wet places. Although really perennials, the plants are usually treated as annuals. Seeds are sown in gentle heat in March or outside in April, the plants eventually being 18 in. apart. The flowers are useful for cutting. For the general treatment of annuals see p. 78.

CREPIS (Hawk's Beard).—A genus with about 130 species of smooth or hairy annual or perennial herbs, with radical or alternate leaves, and solitary or variously paniculate homogamous flower-heads. Involucre cylindrical or bell-shaped. Disc flat or rarely concave, naked or slightly bristly. Achenes cylindrical, striped. Pappus with silky white or brown hairs.

Culture and Propagation.—Very few species of this genus are worth growing. Those mentioned thrive in ordinary sandy soil, with a little lime or brick rubble added. They may be raised from seed sown in spring or autumn in the open air every year in the same way as annuals in general. See p. 78.

C. aurea.—A native of S. Europe 4–12 in. high, with oblong spoon-shaped Dandelion-like leaves. Flowers in autumn, orange, the involucres and stalks covered with long black hairs.

Culture &c. as above.

C. barbata (*Tolphis barbata*).—*Yellow Hawk's Beard.*—A S. European species, rather straggling in habit, 9–18 in. high, with lance-shaped, toothed leaves, and yellow flower-heads, with a purple centre, from June to September. There is a dwarf compact form, better than the type, with deeper yellow flowers.

Culture &c. as above.

C. rubra (*Barkhausia rubra*).—A S. European annual 6–12 in. high, with rosettes of pinnately cut toothed leaves. Flowers in autumn, red, solitary. The variety *alba* has blush-white flowers.

Culture &c. as above.

HIERACIUM (Hawkweed).—A large genus (150 species) of little garden value, closely related to Crepis. Leaves entire or toothed. Flower-heads homogamous, solitary, on long stalks or in loose panicles or corymbs.

Culture and Propagation. — The Hawkweeds thrive with treatment similar to *Crepis*, and may be used in the border or rock garden, or for edges, in partially shaded situations. The plants may be increased by dividing the tufts in early autumn or spring, or by seeds sown as soon as ripe in cold frames, or in the open ground in April and May.

H. aurantiacum. — A native of W. Europe 1–1½ ft. high, with entire elliptic acute leaves. Flowers in summer, orange-red, 8–10 heads in a corymb. Involucre covered with long hairs.

There are several other species in cultivation—chiefly in botanical collections. Perhaps *H. villosum* with silvery leaves and large yellow flowers is best.

ANDRYALA.—A genus with about 12 species of woolly or hairy biennials or perennials, having alternate soft entire sinuate-toothed or pinnately divided leaves. Flower-heads terminal, long-stalked, in loose panicles or dense corymbs. Achenes smooth, 8–10-ribbed. Involucre bell-shaped. Disc flat, pitted. Pappus with silky hairs.

Culture and Propagation.—Andryalas grow well in light dry soil, and may be increased by seeds sown in cold frames in autumn, or in gentle heat in spring, afterwards pricking the seedlings out and transplanting in mild weather; or by division of the roots in spring.

A. lanata.—A S. European perennial about 1 ft. high, with thick woolly, oblong ovate, whitish leaves, lower ones stalked, upper sessile. Flowers in May, yellow, like those of the Hawkweed.

Culture &c. as above.

A. mogadorensis. — A snowy-white shrub, native of Morocco. Flowers in April, bright yellow, about 2 in. across, with an orange centre.

Culture &c. as above.

LACTUCA (Mulgedium). — Blue Thistle Lettuce.—A genus containing 60 species of usually smooth annuals or perennials often with milky juice. Leaves radical or alternate, entire or coarsely toothed or pinnately cut. Flower-heads various, panicled. Involucre cylindrical, usually smooth. Disc flat, naked. Achenes flattened, with a long slender beak. Pappus with long silky hairs.

Culture and Propagation.—The species described below thrive in ordinary garden soil in somewhat shaded places, and may be increased by dividing the roots early in autumn or spring. They are effective looking in the wild garden or on grass-land when grown in bold masses. Seeds are freely produced by most species, and there is no difficulty in raising plants from them. They may be sown when ripe in cold frames or in the open border in warm sheltered spots, and the seedlings may be pricked out, and in spring transplanted to the flowering positions.

L. alpina (*Mulgedium alpinum*).—A pretty perennial about 3 ft. high, native of the mountains of Northern and Central Europe, and N. Scotland. Leaves somewhat lyrate, toothed, 4–8 in. broad, the terminal lobe large and triangular. Flowers in August, 1 in. across, pale blue, in corymbose clusters.

Culture &c. as above.

L. macrophylla.—A noble Caucasian species with stout fleshy stems about 4 ft. high, and large heart-shaped leaves. Flowers in July, large, pinkish-purple, corymbose.

Culture &c. as above.

L. macrorhiza (*Mulgedium macrorhizum*).—A Himalayan perennial 1–3 ft. high, with large Dandelion-like leaves. Flowers in autumn, about 1 in. across, bright violet-purple, in loose corymbs.

Culture &c. as above.

L. Plumieri (*Mulgedium Plumieri*).—An ornamental perennial 6–8 ft. high, native of the Pyrenees. Leaves handsome, large, broad, Dandelion-like, glaucous beneath. Flowers in summer, purple, in large spreading corymbs.

Culture &c. as above.

L. tuberosa.—A neat and handsome perennial 1–1½ ft. high, native of Tauria. Leaves about 1 ft. long and 9 in. wide, like those of the Dandelion in shape. Flowers in autumn, over 1 in. across, pale blue, in loose panicles.

Culture &c. as above.

TRAGOPOGON (Goat's Beard).—A genus containing 30–40 species of biennial or perennial herbs, with alternate linear, entire stem-clasping, often grass-like leaves. Flower-heads terminal homogamous. Involucre cylindrical or narrowly bell-shaped. Disc flat, or convex, pitted. Achenes smooth or slightly hairy. Pappus bristly.

T. glaber (*Geropogon glabrum*). — A smooth S. European biennial about 1½ ft. high, with half stem-clasping linear elongated leaves. Flowers in July, purplish.

Culture and Propagation. — Easily grown from seeds sown in ordinary soil in autumn or spring, where the plants are to bloom. Not of great value as a garden plant.

Salsafy is obtained from *T. porrifolius.* See p. 1145.

LXIII. CAMPANULACEÆ—Harebell or Bell Flower Order

A large natural order containing 53 genera and over 1000 species of herbs, bushes, or shrubs, nearly all of which have milky juice. Leaves without stipules, usually alternate, rarely opposite, entire, toothed or rarely lobed or dissected. Flowers usually hermaphrodite, regular or irregular. Calyx-tube adnate to the ovary, limb usually 5-cleft. Corolla gamopetalous, tubular or bell-shaped. Stamens 5, or as many as the lobes of the corolla, epigynous or epipetalous. Anthers free or united. Overy inferior or half superior, usually 2–5-celled. Stigma bearded or naked. Fruit a capsule or berry, many-seeded.

Tribe I. LOBELIEÆ. — Corolla irregular. Anthers united round the style. Peduncles axillary or at the ends of the shoots.

DOWNINGIA (CLINTONIA).—A genus with 3 or 4 species of smooth annuals having alternate, entire leaves, and flowers in the axils of the upper leaves. Calyx tube linear, adnate, 5-parted. Corolla oblique, upper lobes narrow, lower lip broadly 3-cleft. Stamens free from the corolla. Ovary inferior. Stigma shortly 2-lobed. Capsule linear.

Culture and Propagation. — Downingias are charming little annuals suitable for the summer flower garden. Seeds may be sown in the open border in March and April in ordinary garden soil and the plants later on thinned out to 8 or 9 in. apart. Seeds may also be sown when ripe in cold frames, and the seedlings if necessary may be potted on and grown for conservatory decoration during the winter and spring.

D. elegans. — A native of N.W. America, about 6 in. high, with sessile, ovate 3-nerved leaves. Flowers in summer, solitary, blue, with a white streak on the base.

Culture &c. as above.

D. pulchella (*Clintonia pulchella*).—A pretty Californian annual with small sessile linear lance-shaped leaves, sometimes with one or two small teeth at the base. Flowers in summer, bright blue, with a yellow 'eye' in the centre of a white zone. There are forms known as *alba*, *rubra*, and *atro-purpurea* according to the prevailing colour of the flower.

Culture &c. as above. This species is better known in gardens as *Clintonia*, but as there is another and older genus of that name in the Lily order (see p. 879) it cannot be retained without leading to confusion.

PRATIA.—A genus of slender trailing or creeping herbs, rarely ascending or erect, with alternate, broad, toothed leaves, and 1-flowered peduncles in the axils of the leaves. Flowers rather small, diœcious in some species owing to abortion. Calyx 5-parted. Corolla irregular. Stamen-tube free from, or very slightly adnate to, the corolla. Ovary inferior, 2-celled. Fruit an obovoid or roundish berry with numerous small seeds.

Culture and Propagation. — Pratias are not very well known garden plants, but the species mentioned below are deserving of a place in the rock garden, where their slender stems may trail over the faces of stones and rocks. They flourish in ordinary good garden soil that is well drained, and they like a warm and sheltered position in unfavourable parts of the kingdom. They may be increased in spring by division of the tufts. Seeds may also be sown in cold frames when ripe, or in gentle heat in early spring, in each case pricking the seedlings out and growing on until about the end of May, when they may transferred to the open border.

P. angulata (*Lobelia littoralis*).—A pretty New Zealand trailing plant, the slender stems of which are furnished with small angular or roundish leaves. The long-stalked white flowers, nearly ½ in. long, resembling those of Lobelia in shape, are produced in great profusion during the summer months, and are very conspicuous among the foliage. The whole plant is scarcely an inch high.

Culture &c. as above. Besides its value as a rockery or border plant, this species may also be grown in hanging pots or baskets from which the stems hang down gracefully.

P. repens.—A pretty little plant, native of the Falkland Islands, with somewhat wavy or crenulate kidney-shaped leaves. The flowers are about the same size as those of *P. angulata*, and appear at the same period, but the white ground colour is tinted with violet or faint purple.

Culture &c. as above.

LOBELIA. —This genus contains about 200 species of annual or perennial herbs or bushes, rarely shrubs, with alternate leaves. Flowers solitary or racemose. Calyx tube more or less hemispherical, or obovoid with a 5-parted limb. Corolla irregular slit down the upper side, lobes nearly equal and united, or often more or less distinctly two-lipped. Stamens usually free from the corolla tube. Anthers united, all or only two of them bearded. Ovary inferior or half superior, 2-celled.

Culture and Propagation. — Judiciously used, Lobelias may be regarded as among some of the most ornamental plants in the flower garden. The dwarf forms are excellent for edgings and borders, and the taller forms are valuable for growing in bold masses in beds by themselves either on grass or near the margins of lakes, streams &c. Most kinds ripen seeds freely, and by sowing these in autumn or spring a very large number of plants can be obtained. The plants may also be increased by division in spring, and also by means of cuttings in a warm greenhouse or hotbed.

L. cardinalis (*Cardinal Flower*).—A brilliant United States perennial 1–3 ft. high, with oblong lance-shaped denticulate leaves. Flowers in July and August, scarlet, in terminal one-sided leafy racemes.

Culture and Propagation. — This species makes a fine show if planted in masses. It loves moist or swampy and partially shaded places, and is not hardy in many places, although it will stand a few degrees of frost as far as the midland counties. During severe winters the roots may be protected with leaves or litter, or the crowns may be lifted and stored like Dahlia roots in a dry airy place free from frost.

Seeds may be sown in cold frames in spring, or in hotbeds, and the seedlings pricked off into small pots and planted out in May. The crowns of the old plants may also be carefully divided in spring—not in autumn—and at the same time cuttings of the roots may be made and struck in gentle heat.

L. Erinus. — A charming and well-known South African species 3–6 in. high. Lower leaves obovate toothed, upper narrow lance-shaped. Flowers blue with a white or yellowish throat; the 2 upper petals narrow erect, the 3 lower large and broad.

There are many more or less distinct varieties of this species, the best known being: *compacta*, with white and blue forms, among the latter being *Crystal Palace*; *speciosa* with *Emperor William* and *Blue King*; *pumila*, very dwarf, with *grandiflora*, *magnifica*, *azurea*, and *Mrs. Murphy*, pure white, *paxtoniana*, *ramosoides*, *stricta multiflora*, *gracilis* (white and blue). There is also a double-flowered variety, and a mauve one, and attempts have often been made to produce a yellow variety, but not with much success so far.

Lobelia Erinus and its many forms are chiefly valuable for edgings to borders and beds. On patches of sloping ground they make a beautiful blue carpet when planted closely together, the effect in the distance being very fine.

Culture and Propagation. — The plants are not hardy enough to stand the winter unprotected, but they are easily raised from seeds sown in late autumn or early spring, and also from cuttings. The seeds are minute dust-like, and require to be sown with great care, as thinly as possible, and without any covering or only the slightest sprinkling of fine soil. Seedlings raised in the autumn may be put into small pots or shallow boxes and kept near the glass during winter. The tops may be used as cuttings, and will strike in moist heat in early spring. The old plants in autumn may be potted up, and when established will produce quantities of cuttings to make sturdy spring plants, and stock produced either from seeds or cuttings in autumn are far better and earlier than those produced in spring.

This class of Lobelia grows well in ordinary good garden soil, and makes full masses during the summer.

L. fulgens. — A handsome Mexican perennial 1–2½ ft. high, with lance-shaped denticulate downy leaves and reddish downy stems. Flowers from May to September, intense scarlet, about 1 in. long, downy outside, in terminal, leafy, somewhat one-sided racemes. The variety *Queen Victoria* is a more vigorous plant and larger in all its parts than the type. The leaves are darker in tone and the flowers of a deep scarlet. There is also a form called *rosea* with bronzy-green foliage and rosy flowers.

This species is closely related to *L. cardinalis* and is often confused with it. Its cultural treatment is the same. See above.

L. Gerardi.—A vigorous-growing plant said to be a hybrid between *L. fulgens Queen Victoria*, and an improved form of *L. syphilitica*, but not nearly so good as either. The plant is said to reach a height of 4–5 ft. Leaves and stems green and downy. Flowers borne all up the stem in the axils of the leafy bracts, pale blue. Grown in rich free soil it may attain fine proportions.

Culture &c. as above for *L. cardinalis.*

L. hybrida. — This is the result of frequent crossings and selections between *cardinalis*, *fulgens*, *splendens*, and *syphilitica*, and some very fine free-flowering forms have been obtained, all showing traces of their hybrid origin. The flowers vary in colour from rose, violet, amaranth &c.

Culture and Propagation.—They may be grown like their parents.

L. ramosa.—A smooth or downy much branched New Holland annual 8–10 in. high. Lower leaves oblong lance-shaped, toothed; upper ones linear. Flowers intense blue with a white blotch in the throat; two-lipped, the lower lip having 3 broad lobes. There are forms with white and rosy flowers; similar to some forms of *L. Erinus.*

Culture and Propagation. — This species flourishes in ordinary good garden soil with plenty of leaf-mould, and may be raised from seeds sown in gentle heat in March, or in autumn as soon as ripe in a greenhouse or cold frame. The seedlings are pricked off, and by the end of May are fit for the open border.

L. splendens. — A beautiful Mexican perennial 1–2 ft. high, very near *L. fulgens*, but quite smooth in all its parts. Leaves lance-shaped denticulate. Flowers from May to September, scarlet, in terminal racemes. There are variations in colour, probably the result of intercrossing.

Culture &c. the same as for *L. cardinalis.*

L. syphilitica.—A native of Carolina, 1–2 ft. high, with ovate oblong sessile unequally serrated leaves pointed at both ends. Flowers in autumn, light blue, borne in a long leafy raceme. There are several varieties with purple-violet, rose, white and intermediate shades of colour.

Culture &c. as above for *C. cardinalis.* In order to keep this species true, it should be increased by division and cuttings, as seedlings often exhibit a good deal of variation.

L. Tupa (*Tupa Feuillei*).—A Chilian perennial 6–8 ft. high, with thick shrubby stems, and ovate lance-shaped, sessile, decurrent leaves, clothed with a soft whitish down. Flowers in autumn, large, reddish-scarlet, in terminal spiky downy racemes.

Culture &c. as described under *C. cardinalis.*

Tribe II. CAMPANULEÆ. — Corolla regular or slightly irregular. Anthers free or rarely united round the style.

JASIONE (SHEEP'S SCABIOUS). — A genus containing 12 species of annual, biennial, or perennial herbs, more or less prostrate, smooth or hairy. Flowers in terminal slightly stalked or sessile heads, bracts sometimes forming a leafy involucre. Corolla 3-parted almost to the base, lobes narrow. Stamens free. Anthers slightly united below, free above. Capsule inferior.

Culture and Propagation. — Pretty plants for the rock garden or border in sandy soil. The annual species may be raised by sowing seeds in the open border at the end of March and about September. The perennials by the same means in

March and September, and also by dividing the roots at the same periods.

J. montana.—A pretty hairy or downy British annual 1–1½ ft. high, with obovate oblong leaves ½–1 in. long. Flowers from June to September, lilac-blue or whitish, in hemispherical heads ½–¾ in. across. The seaside form *littoralis* is usually a biennial.

Culture &c. as above. Increased by seeds sown annually.

J. perennis. — An elegant perennial 1–1½ ft. high, native of W. Europe. Leaves rather hairy, lower ones obovate, upper oblong linear. Flowers from June to August, blue, in dense roundish heads.

Culture &c. as above. Increased by seeds and division.

WAHLENBERGIA (*Tufted Harebell*).—A genus containing about 80 species of annual, perennial, or woody-stemmed herbs with alternate or rarely opposite leaves. Flowers often blue and nodding. Calyx tube adnate, hemispherical, turbinate or obconical-oblong; limb usually 5-parted, corolla bell-shaped, tubular, or somewhat rotate, shortly or rarely deeply 5-cleft, very rarely 3–4-cleft. Stamens free. Capsule inferior or half superior, erect.

Culture and Propagation.—Wahlenbergias (including *Edraianthus*) are beautiful, strong-growing, free-flowering perennials, eminently suited for the rockery or flower garden. They are easily grown in good sandy garden soil, but do not like stagnant moisture at the roots. A sunny airy situation suits them best. They ripen seed freely, and if sown as soon as ripe in autumn, a good supply of plants will always be available. Division of the root is not altogether successful unless very carefully done. The roots are very long, and unless they are carefully taken up they are too much injured to develop new ones readily.

W. capensis (*Campanula capensis*).—A S. African half-hardy annual 1–1½ ft. high, with ovate lance-shaped, hairy, irregularly toothed leaves 1–2 in. long. Flowers in July, dark blue inside, spotted with black bluish-green outside, drooping at first, nearly erect afterwards.

Culture and Propagation.—Being an annual it is best to sow the seeds in gentle heat in March and plant the seedlings out at the end of May; or the seeds may be sown in cold frames when ripe, and the seedlings wintered under glass until the following spring.

W. gracilis (*Campanula capillaris*). *Australian Harebell.*—A native of Australia and New Zealand, 6–24 in. high. Lower leaves spoon-shaped, toothed, upper ones linear-oblong, entire toothed, or sinuate. Flowers in April, variable in size and form; blue, purple, or white, about ½ in. long, 3–5-lobed.

Culture &c. as above.

W. graminifolia.—A beautiful Italian species forming tufts of long grassy leaves, and masses of large purple flowers nestling among the foliage during the summer months.

Culture &c. as above. This species seeds freely and seedlings come up in spring without any trouble.

W. hederacea (*Campanula hederacea*). A British and European perennial with thread-like creeping stems, and stalked, roundish or heart-shaped, angled or obscurely lobed leaves about ½ in. across. Flowers in July and August, pale blue, ⅓ in. across. There is a variety called *cranmoriensis*. This species grows naturally in bogs and damp woods, and should therefore be given a moist shaded place in the border or rockery.

Culture &c. as above.

W. Kitaibeli.—A sturdy tufted perennial about 6 in. high, native of Transylvania, with purplish, softly hairy stems, and linear awl-shaped, toothed leaves. Flowers in summer, blue, tinged with purple.

Culture &c. as above.

W. Pumilio. — A pretty Dalmatian perennial 2–3 in. high, with tufts of bluish tinted needle-like leaves ½ in. or more long. Flowers from May to July, reddish-lilac or bluish, in great profusion.

Culture &c. as above. A beautiful rock plant.

W. Pumiliorum.—A rare and beautiful rock plant 2–3 in. high, like *W. Pumilio*, with a more straggling habit, shorter and narrower leaves, and longer-tubed soft blue flowers which are produced in great abundance in summer.

Culture &c. as above.

W. saxicola (*W. albomarginata; W. vincæflora*).—*New Zealand Bluebell.*—A charming rock plant 2–3 in. high, native of the New Zealand mountains. Leaves in tufts or rosettes, spoon-shaped, usually hairy above, entire or crenate-toothed, white and thickened on the margins. Flowers in June, pale lilac, solitary, on long scapes.

Culture &c. as above.

W. serpyllifolia (*Campanula serpyllifolia*).—A dwarf Dalmatian rock plant with small Thyme-like leaves and masses of purple-blue flowers in early summer. There is a variety called *dinarica*.

Culture &c. as above.

W. tenuifolia (*W. dalmatica; Edraianthus tenuifolius*).—A pretty Dalmatian rock plant 3–6 in. high, with tufted, purplish, hairy stems, and linear entire bristly leaves. Flowers in June and July, violet-blue, white at the base, 6–10 in a dense terminal head.

Culture &c. as above. Although quoted as a synonym, *W. dalmatica* seems to be a distinct form with rather broader linear leaves and deep purple flowers.

PLATYCODON (CHINESE BELL FLOWER). — This genus consists of *P. grandiflorum* and its varieties, and is chiefly distinguished from *Campanula* in which it was formerly included by having each part of the flower--calyx, corolla, stamens, ovary, stigma, and capsule—in 5 separate or united parts.

P. grandiflorum (*P. autumnale; P. chinense*). — A beautiful Chinese and Japanese perennial 6–24 in. high, with ovate lance-shaped, toothed leaves, often opposite, or in whorls. Flowers in July and August, 2–3 in. across, purple, broadly bell-shaped, solitary or few at the tips of the branches. The variety *albidum* has white flowers; *glaucum* has glaucous leaves; and *Mariesi* (or *pumilum*) is a splendid variety, dwarfer in habit than the type, with larger flowers varying from pale to dark bluish-purple.

Culture and Propagation. — Platycodons thrive under conditions similar to most of the *Wahlenbergias*, and like the latter are best raised from seed, as the roots do not bear dividing very well. The seedlings may be sown in cold frames in rich sandy soil and leaf-mould when ripe, or in spring. When the seedlings are large enough to handle easily they should be pricked out into pots or pans containing similar soil, or even in the frames, where they may be allowed to develop until the following spring. They may then be planted out in mild showery weather about 1 ft. apart. Cuttings of the young shoots about 3 in. long may be put in a close frame in sandy soil in spring, and a fair percentage will root. Cuttings of the roots about 2 in. long will also root in gentle heat in spring, and at the same period any large tufts may be very carefully divided. The best soil for Platycodons is a good sandy loam neither too light nor too heavy, to which has been added some well-decayed leaf-mould. Where the plants are allowed to grow for several years without disturbance it is wise, if not actually essential, to give them a good mulching or top dressing with manure every winter so as to replenish the food in the soil.

OSTROWSKYA.—A genus at present having only the following species:—

O. magnifica.—A noble-looking hardy perennial 4–5 ft. high, native of the higher mountains of Eastern Bokhara. It has large tuberous roots about 2 ft. long when fully grown, and the stems are furnished with circles of large lance-shaped acute toothed leaves. The beautiful bell-shaped flowers 3½–4 in. across appear in July and are white stained and veined with lilac-purple. The corolla is 5–9-lobed, and the stamens are arranged in the centre round a bright yellow columnar disc. The seed capsules which appear after the flowers are somewhat remarkable. They are top-shaped with 6-8 stiffish projections or dried calyx teeth, 1-1½ in. long, radiating from the circumference, and down the sides of the capsule are deep furrows between the calyx teeth.

Culture and Propagation. — This remarkably handsome plant has been appropriately called the 'Giant Bell-flower' on account of its stature and the great size of its flowers. It is quite hardy and flourishes in good and well-drained garden soil, preferring, however, rich sandy loam deep enough to allow its long roots to strike well downwards. Seeds ripen freely in ordinary good seasons, and should be sown in cold frames when ripe, to increase the stock. The seedlings, however, do not flower until about the third or fourth season. The roots being so long and brittle and easily injured, it is scarcely possible to increase the plants by dividing them.

CODONOPSIS. — This genus contains about 12 species of annuals or perennials with a tuberous rootstock, climbing, erect, or decumbent stems, and alternate or irregularly opposite leaves. Calyx tube adnate, hemispherical; limb 5-parted, leafy; corolla broadly tubular or bell-shaped, 5-cleft. Stamens free. Ovary nearly inferior, or half superior, truncate or conical at the apex, 3–5-celled. Capsule dry or fleshy.

Culture and Propagation. — These plants are not very well known, although they are well worth a place in the flower border. They thrive in ordinary good garden soil, and are probably better raised from seeds than by dividing the roots. The same treatment recommended above for Platycodon will suit Codonopsis perfectly.

C. clematidea (*Glossocomia clematidea*).—A Himalayan perennial 2–3 ft. high, with ovate pointed stalked leaves, and white bell-shaped flowers tinged with blue.

Culture &c. as above.

C. ovata.—A native of the Western Himalayas, 12–18 in. high, with ovate, alternate, and opposite leaves, stalked below, sessile above. Flowers in June and July, solitary, nodding, about 1½ in. long, bell-shaped, pale blue with deeper veins, and a purple zone near the base outside; in the interior are two zones of purple, one of yellow, and one black at the base surrounding the upper portion of the ovary.

Culture &c. as above.

C. rotundifolia. — A slender climbing Himalayan annual with opposite or rarely alternate, ovate, bluntish leaves, and large yellowish-green bell-shaped flowers veined with dark purple. The variety *grandiflora* has flowers more beautifully and conspicuously veined than the type.

Culture &c. as above.

CYANANTHUS.—A genus of 6 species of slender annuals or perennials clothed with white, black, or rusty hairs. Leaves alternate, often small, entire or somewhat lobed. Calyx nearly free, tubular, bell-shaped, or ovoid inflated, 5-cleft. Corolla funnel- or bell-shaped, 5-lobed. Ovary superior, 3–5-celled. Stigma shortly 3–5-cleft, with linear lobes. Capsule conical.

Culture and Propagation. — These plants thrive in sandy peat and leaf soil, and like plenty of water during growth, as their long fleshy roots greedily absorb moisture. They are suitable for the rock garden in semi-shaded spots. In hot, dry seasons seeds may ripen, in which case they should be sown at once to increase the stock. Cuttings of the young shoots may be put in sandy peat in spring or summer, and kept moist and shaded until rooted. The nature of the roots is against successful division of the crowns. It is possible that plants may be obtained from root-cuttings about 1 in. or so long, placed in brisk bottom heat in early spring.

C. incanus. — A pretty Himalayan rock plant 3–4 in. high, with oval, slightly lobed leaves covered with soft white hairs. Flowers in August, soft sky-blue, tube 1–1½ in. long; throat lined with soft white hairs.

Culture &c. as above.

C. lobatus. — A native of the Himalayas, 3–4 in. high, with small, fleshy, obovate, lobed leaves, and hairy stems and calyx. Flowers in August and September, bright purple-blue, about 1 in. across, funnel-shaped, with 5 tongue-shaped reflexed segments.

Culture &c. as above.

MICHAUXIA.—A genus containing 4 species of erect hairy or smooth biennial herbs, with irregularly toothed and lobed leaves, few on the stem. Calyx tube adnate, broadly turbinate or hemispherical; limb 8–10-parted, sinuses with reflexed dilated appendages. Corolla 8–10-parted, lobes narrow, spreading or recurved. Stamens 8–10, free. Ovary inferior, 8–10-celled. Style thick; stigma cleft into 8–10 linear lobes. Capsule hemispherical.

Culture and Propagation.—Michauxias like a deep rich loamy soil and warm sheltered sunny places in the border with a little shade at midday. They are best raised from seeds sown in September in a cold frame, the seedlings being protected by glass until about the end of May, when they can be planted out with safety. Seedlings raised in spring do not make such fine plants. They do not always look very happy in the garden.

M. campanuloides. — A remarkable plant 3–8 ft. high in favourable places, native of the Levant. Stems whitish, very hairy. Leaves stem-clasping, oblong, coarsely toothed and lobed, 3–6 in. long below, becoming gradually smaller upwards. Flowers in July, white tinged with purple outside, drooping on an erect pyramidal spike 12 in. or more long. Segments of the corolla narrow oblong, reflexed and recurved at the tips. Style very conspicuous pale green, about 1 in. long, with recurved stigma lobes.

Speaking of this species in the 'Gardeners' Chronicle' Mr. Wolley-Dod says: 'There is a distinguished look about this handsome hardy biennial which makes it worth a little trouble. I raised four plants from a packet of seed in the spring of last year, which were planted out in autumn, and all survived the winter; but three went off during the late spring frosts, and the one survivor is worth a description. It is just coming into flower (July) and has 4 main stalks, from each of which about 20 laterals grow, commencing a few inches from the ground. It is now 5 ft. high, and more than 8 ft. across, and already shows about 2,000 flower-buds; but tertiary stalks are coming in the axils of the lateral stalks, so that the flowering would be endless but for the winter. In general appearance the plant is like a large plant of the native Succory, of which it has the stiff robust habit. A packet of seed sown this year has produced 200 or 300 plants.'

M. lævigata.—A Persian milky plant, said to reach 11 ft. high in its wild state. Leaves ovate, coarsely net-veined, doubly serrate, with harsh erect hairs on each side. Flowers in August, white, with 10 corolla segments.

Culture &c. as above.

M. Tchihchatchewi.—Another remarkable Bell Flower, from Asia Minor, with rosettes of large coarsely toothed leaves 1 ft. long, and dense spikes, 5–6 ft. high, of pure white flowers each about 1½ in. across, borne in June and July.

Culture and Propagation.—Sow the seeds in spring in shallow pans or boxes in a cool frame or greenhouse. Prick the seedlings off when large enough to handle, and they will be ready for planting out in May; or they may be sown in September, as above recommended, and the seedlings transferred to the open border in spring.

PHYTEUMA (Horned Rampion).—A genus containing 50 species (or fewer) of perennial herbs with long-stalked radical leaves, those of the stalk being alternate and smaller. Flowers variously disposed, often sessile in heads or dense spikes at the ends of the branches. Calyx-tube adnate, hemispherical or oblong obconical, limb 5-parted. Corolla 5-parted almost to the base; lobes linear and united for some time. Stamens free. Ovary inferior, 2–3-celled. Stigma with 2–3 linear lobes.

Culture and Propagation.—The Horned Rampions thrive in a mixture of sandy peat, loam, and leaf mould, and are effective plants in warm parts of the rock garden or flower border. Most of them may be increased by seeds sown in spring, either in gentle heat in March or outside in April. They may also be divided with care in spring, but not until the plants have made some good tufts.

P. betonicæfolium. — A smooth-stemmed Pyrenean perennial 6–12 in. high, with oblong or linear lance-shaped toothed leaves. Flowers in June, blue, in ovoid spikes.

Culture &c. as above.

P. campanuloides.—A Caucasian species 1–2 feet high, with bluntly ovate-crenate leaves. Flowers from June to August, deep violet-blue, 1–3 in a spike 2–3 in. long.

Culture &c. as above.

P. Charmeli. — A native of the Pyrenees and Apennines 6–12 in. high. Leaves kidney- or heart-shaped acute, long-stalked. Flowers from May to August, blue, in rounded heads.

Culture &c. as above. This species comes very near *P. Scheuchzeri.*

P. comosum.—A beautiful but rather slow-growing rock plant 3–6 in. high, native of Central Europe. Leaves roundish heart-shaped ovate, coarsely and sharply toothed. Flowers in July, purple or blue, swollen at the base, and disposed in dense umbel-like clusters, the corolla being flask-shaped with 5 slits at the swollen base.

Culture &c. as above. One of the remarkable features of this species is the hairy style which projects very much from the narrow mouth of the corolla.

P. Halleri is closely related to *P. spicatum*, but has deep violet flowers in heads at first clustered, afterwards cylindrical. It grows about a foot high, and has long-stalked lower leaves with a heart-shaped base and serrate edges, those on the upper portion of the stalks being much narrower.

Culture &c. as above. When grown in large masses this has a very pretty effect in the rockery. It likes warm sunny positions.

P. hemisphæricum. — This dwarf species grows in the crevices of the Alps and Pyrenees, and is 2–6 in. high. Leaves linear grass-like. Flowers blue, in rounded heads on the top of straw-like stems and surrounded by oval-shaped bracts.

Culture &c. as above. This species flourishes in rather dry stony places and may be grown in the cracks or fissures of old walls, ruins, or chinks in the rockery. During growth, however, it likes plenty of moisture at the root.

P. humile.—A pretty Swiss rock plant about 3 in. high, with tufts of linear lance-shaped pointed leaves. Flowers in July, blue, in round heads.

Culture &c. as above.

P. limonifolium. — A native of South Europe and Asia Minor, 2–3 ft. high, with smooth lance-shaped slightly toothed leaves. Flowers in June and July, blue, sessile, with conspicuous yellow anthers, and borne on long interrupted spikes.

Culture &c. as above.

P. Micheli (*P. scorzonerifolium*).—A S. European perennial, 1–2 ft. high, with ovate heart-shaped and linear lance-shaped leaves. Flowers in July and August, pale or dark blue, in ovoid spikes.

Culture &c. as above.

P. orbiculare. — A pretty native species 6–18 in. high. Lowest leaves lance-shaped cordate, crenate, upper ones sessile linear lance-shaped. Flowers in July and August, deep blue, in round heads.

Culture and Propagation. — This species thrives in chalky gritty soil, and is best raised from seeds sown in cold frames in autumn.

P. pinnatum.—A native of Crete 3–6 ft. high. Lowest leaves ovate acute, upper ones pinnate, with margined and lobed stalks. Flowers in August, blue or white, in loose racemes.

Culture &c. as above.

P. Scheuchzeri. — A native of the European Alps, about 1 ft. high. Leaves ovate lance-shaped, bluntly toothed, upper ones linear, nearly entire. Flowers in May, deep blue, in round heads.

Culture &c. as above.

P. Sieberi. — A native of the Apennines 3–6 in. high. Lower leaves ovate roundish, somewhat heart-shaped crenate; upper ones lance-shaped, coarsely toothed, and stem-clasping.

Culture &c. as above.

P. spicatum. — A British species 1–3 ft. high. Lower leaves long-stalked, heart-shaped, ovate acute, twice serrate; upper ones ovate lancé-shaped. Flowers in July, white, creamy, or blue, in long cylindrical spikes. Styles very long; stigmas two.

Culture &c. as above. Enjoys fully exposed places in the rockery in ordinary good soil.

CAMPANULA (Bell Flower).—A genus containing 230 species of beautiful perennial (rarely annual or biennial) herbs varying a good deal in habit, and having the lower leaves usually larger than the upper ones. Flowers in racemes, spikes, or heads, usually blue, violet or white. Calyx tube adnate, hemispherical, turbinate or ovoid, limb deeply 5- cleft or parted. Corolla bell-shaped, rarely funnel-shaped or rotate, more or less 5-cleft. Stamens free. Ovary 3-5-celled. Stigma 3–5-lobed.

Culture and Propagation. — Campanulas vary greatly in size, habit, and flower; but they may all be considered beautiful and worth growing. Most of them are easily cultivated and spread freely in ordinary good soil. The dwarf or alpine species are charming plants for the rock garden, and the larger kinds make beautiful masses of colour in the border. The perennial kinds are easily raised from seed sown in cold frames in spring or autumn, but are more usually increased by dividing the tufts, or by rooting cuttings of the young shoots in spring under glass protection. Many of the kinds may also be increased by inserting cuttings of the roots about 2 in. long in bottom heat in the early spring months. Where the plants are allowed to grow in the flower borders or rockeries without being disturbed for a few years it is advisable to give a good mulching or top dressing of well-decayed manure in autumn or winter. Many of the taller growing kinds will be improved by having a stake placed to them, so that the shoots may be kept from trailing the flowers in the dirt.

C. abietina. — A tufted slender-stemmed species 9–15 in. high, native of E. Europe. Flowers in July and August, light blue, in loose branching spikes.
Culture &c. as above.

C. Adami. — A Caucasian species about 6 in. high, with spoon-shaped or obovate coarsely toothed leaves. Flowers in July, bluish, semi-erect, one on the top of each stem.
Culture &c. as above.

C. alliariæfolia.—A very pretty Caucasian perennial 12–18 in. high, with erect stems, branching above, and furnished with grey downy or velvety leaves. The drooping white flowers about 1½ in. long are borne in long racemes at the ends of the shoots about July.
Culture &c. as above.

C. Allioni (*C. alpestris; C. nana*). A charming alpine species 3–4 in. high, with creeping, fleshy roots, and rosettes of bluntly linear lance-shaped leaves. Flowers from July to September, blue, rarely white, large, solitary, somewhat nodding.
Culture and Propagation.—Requires a gritty, well-drained soil, and exposed situation with plenty of moisture during growth. It makes a handsome carpet in the rock garden.

C. alpina. — A pretty Tyrolese rock plant 3–9 in. high, covered with a slight greyish down. Leaves linear lance-shaped, slightly crenate, lower ones crowded. Flowers in July, deep blue, about ¾ in. across, in a loose pyramidal spike.
Culture &c. as above. Suitable for limestone niches in the rockery.

C. balchiniana.—A singular and beautiful hybrid between *C. fragilis* and the white variety of *C. isophylla* with creeping hairy stems and roundish coarsely toothed leaves, densely covered with long straight whitish hairs. When quite young the leaves are of a pale violet colour, when old edged with creamy white. Flowers in May and June, soft lilac-blue, and remarkable for having the sepals developed into 5 shortly stalked ordinary green leaves.
Culture &c. as above. Owing to the imperfect anthers in the flower, this plant will probably have to be increased almost entirely by cuttings which may be inserted in sandy soil about February and March and placed in gentle heat. It seems to have a delicate constitution.

C. barbata. — A deep-rooting native of the European Alps 6–18 in. high, with hairy lance-shaped leaves. Flowers in June, pale blue, woolly in the throat of the corolla, in loose racemes. The variety *alba* has white flowers, and is a pretty plant for the rock garden.
Culture &c. as above.

C. betonicæfolia.—A somewhat hairy species about 1½ ft. high, native of Mt. Olympus. Leaves elliptic-oblong or ovate, crenate. Flowers in May, purple-blue, with a pale yellow base.
Culture &c. as above.

C. bononiensis.—A native of Europe 2–3 ft. high. Leaves heart-shaped ovate, pointed, serrulate. Flowers in July, rather small, bluish-violet, in long racemes. There is a pretty variety with white flowers.
Culture &c. as above.

C. cæspitosa. — A beautiful strong-growing alpine, 4–6 in. high. Lower leaves crowded, shortly stalked, ovate, glandularly toothed, shining green. Flowers from May to August, deep blue, drooping, solitary, or 3-4 on the top of each stem. The variety *alba* has white flowers.
Culture &c. as above. A fine plant for nooks, corners, crevices &c. in the rock garden in good rich loam.

C. carpatica.—A pretty Transylvanian rock plant 9–12 in. high. Lower leaves long-stalked, ovate, heart-shaped toothed, upper ones short-stalked, ovate acute. Flowers from June to August, blue, broadly bell-shaped, in loose panicles.

There are several varieties of this species, the best being *alba* with smaller wavy white flowers; *pelviformis*, a seedling form 9–18 in. high, with ovate heart-shaped toothed leaves, and fragrant lilac flowers, nearly 2 in. across; *turbinata*, similar but dwarfer, with deep purple, erect flowers, or pale purple in the form known as *pallida*. The white and blue forms mixed look very pretty.
Culture &c. as above.

C. caucasica.—A handsome Caucasian species 6–9 in. high. Leaves bluntly obovate, or lance-shaped. Flowers in July, violet-blue, bearded inside, drooping.
Culture &c. as above.

C. Cenisia.—A charming Italian rock plant about 3 in. high, with rosettes of bluntly obovate or ovate-oblong leaves. Flowers in June, deep blue, solitary, erect and very attractive.

Culture &c. as above.

C. cervicaria (*Throatwort*).—A European biennial 1–2 ft. high. Leaves bluntly linear lance-shaped or pointed, crenate-serrate. Flowers in July, blue, hairy outside, in round heads.

Culture &c. as above. Being a biennial it is necessary to sow seeds every year to maintain a stock of this species.

C. collina.—A Caucasian species about 1 ft. high, with ovate-oblong crenate or lance-shaped linear leaves. Flowers in July and August, deep blue, in long one-sided racemes.

Culture &c. as above.

C. dichotoma.—A hairy annual about 6 in. high, native of S.W. Europe, with forked branches and ovate acute slightly crenate leaves. Flowers in July, bluish-purple, drooping, solitary in the forks of the branches and stem.

Culture &c. as above. Sow seeds in gentle heat in March or in the open ground in April every year.

C. drabæfolia.—A hairy Grecian annual about 3 in. high, with much-forked stems, and elliptic oblong toothed leaves. Flowers in July, white, tipped with violet-blue. There is a pure white variety, *alba*.

Culture &c. as above. Sow seeds where intended to bloom in the rockery every year in April or May, or in gentle heat in March, and afterwards prick out the seedlings.

C. Elatines.—A pretty creeping downy rock plant about 3 in. high, native of Piedmont. Leaves roundish or heart-shaped, coarsely and sharply toothed. Flowers from June to August, bluish-purple, in racemes or panicles.

Culture &c. as above.

C. elatinoides.—A downy rock plant 2–4 in. high, native of Piedmont, having heart-shaped oval acute leaves with coarsely toothed margins. The bluish-purple flowers appear from June to August in clusters or panicles.

Culture &c. as above.

C. elegans.—A pretty and little known Siberian perennial 2–3 ft. high with oval lance-shaped acute leaves, rounded or heart-shaped at the base and irregularly toothed on the margins; the lower leaves have long stalks, and are greyish-green and rough beneath. The rather large drooping flowers appear in June and July, and are borne in a long spike at the ends of the shoots.

Culture &c. as above.

C. Erinus.—A hairy annual species 8–9 in. high, native of the Mediterranean region. Leaves obovate or ovate, toothed. Flowers from May to August, pale bluish-rose or white, bearded at the base.

Culture &c. as above. Sow seeds every year in April and May in parts of the rockery where the plants are intended to bloom, and thin out the seedlings.

C. excisa.—A rare rock plant 3–6 in. high, native of the mountains of Central Europe. Leaves linear pointed, slightly toothed or entire. Flowers in June, blue, solitary, drooping.

Culture &c. as above.

C. fragilis (*C. Barrelieri*).—A South Italian rock plant 4–6 in. high, with more or less prostrate branches, downy when young. Leaves more or less roundish heart- or kidney-shaped, rather deeply lobed. Flowers in July and August, clear lilac-purple, white in the centre, solitary or in pairs, more or less erect.

Culture &c. as above. Owing to its trailing habit this species is suitable for growing in hanging pots or baskets.

C. garganica.—A very variable Italian rock plant 3–6 in. high. Lower leaves long-stalked, kidney-shaped; upper ones heart-shaped, crenate, toothed, downy. Flowers from May to September, blue, rotate, deeply 5-lobed, in axillary clusters. The variety ***hirsuta*** has saucer-shaped purple-blue flowers, and leaves densely covered with long stiff white hairs.

Culture &c. as above.

C. glomerata.—A handsome British and European species 1–2 ft. high. Lower leaves long-stalked oblong or ovate heart-shaped crenate; upper ones sessile ovate, half stem-clasping. Flowers in September and October, bright blue, mostly in a terminal head. There are several varieties and forms, the best known being ***dahurica*** with large heads of deep blue flowers. There is also a double-flowered variety, ***flore pleno***, and ***alba***, a somewhat rare white-flowered one.

Culture &c. as above. They all grow well in dry chalky soil.

C. grandis.—A fine Siberian species 1-2 ft. high, with unstalked lance-shaped serrate leaves. Flowers in June, pale violet-blue, broadly bell-shaped, with pointed lobes. *Alba* is a white-flowered variety.
Culture &c. as above.

C. Grossecki.—A handsome species with leafy stems about 2½ ft. high, native of E. Europe. Leaves large, heart-shaped pointed, coarsely toothed. Flowers in summer, violet, large, in long racemes.
Culture &c. as above.

C. haylodgensis.—This pretty rock plant 6-9 in. high is supposed to be a hybrid between *C. carpatica* or *C. pulla* and *C. pusilla.* Lower leaves roundish heart-shaped, slightly crenate; upper ones ovate heart-shaped, distinctly toothed. Flowers in August, pale blue, open bell-shaped.
Culture &c. as above.

C. Hendersoni. — A handsome plant about 1 ft. high, supposed to be a hybrid between *C. alliariæfolia* and *C. carpatica.* Lower leaves more or less heart-shaped ovate, slightly crenate, on long stalks; upper ones sessile, oblong. Flowers from July to September, rich mauve, in large pyramidal racemes.
Culture &c. as above.

C. isophylla (*C. floribunda*).—A beautiful free-flowering Italian species 3-6 in. high, with slender trailing stems, with stalked roundish heart-shaped, crenately toothed leaves. Flowers in July and August, over 1 in. across, pale lilac-blue, with a grey centre, deeply salver-shaped. The variety *alba* is exactly like the type but has pure white flowers. The variety *Mayi* is a quite new and beautiful free-flowering form, with downy and greyish-white heart-shaped coarsely toothed leaves, and bright mauve-blue flowers nearly 2 in. across.
Culture &c. as above. Cuttings rooted in heat in February produce fine flowering plants by July and August. This species and its varieties are valuable for growing in hanging baskets or pots owing to the trailing stems which are studded with blossoms. It cannot, however, be regarded as hardy except in the mildest parts of the south and west.

C. Jacobæa.—A half-hardy bush 2-3 ft. high, native of Cape de Verde. Leaves sessile or nearly so, more or less oblong-ovate narrowed at the base; upper ones heart-shaped half stem-clasping. Flowers in early summer, deep blue, 1-1½ in. long on curved pedicels.
Culture &c. as above. This species is not very well-known. It may possibly stand the winter in the mildest parts of the south and west coasts.

C. lactiflora (*C. celtidifolia*). — A vigorous Caucasian species 2-6 ft. high, with sessile ovate lance-shaped sharply toothed leaves. Flowers from July to September, milky white, tinged with blue, erect, in loose panicles. The variety *cærulea* has blue flowers.
Culture &c. as above.

C. lamiifolia.—A handsome Caucasian species 2-2½ ft. high, with heart-shaped toothed leaves with a whitish under surface, and beautiful drooping white flowers in long racemes in June and July.
Culture &c. as above.

C. Langsdorffiana.—A native of the mountains of N. Asia and America, 3-9 in. high, with lance-shaped toothed leaves. Flowers blue, solitary, or in few-flowered panicles somewhat resembling those of *C. rotundifolia.*
Culture &c. as above.

C. latifolia.—A strong-growing British plant 3-6 ft. high, with ovate lance-shaped pointed and toothed leaves, often 6 in. long and 2 in. broad. Flowers in July, blue, axillary, forming a leafy raceme. The variety *alba* has white flowers; *eriocarpa* has hairy leaves and calyx; *macrantha* is a hybrid form with hairy stems and leaves and large blue flowers; *Burghalti* and *Van Houttei* are two fine forms—probably hybrids—with pale and dark blue drooping flowers about 2 in. long, and deeply 5-lobed.
Culture &c. as above.

C. Lœflingi.—An annual species 6-18 in. high, native of S.W. Europe. Lower leaves ovate kidney-shaped; upper ones ovate stem-clasping. Flowers in July, blue or violet, white at the base, with a deep coloured zone beneath the middle.
Culture &c. as above. Seeds must be sown annually to keep up a stock of this species either in the border where it is required to bloom, or in gentle heat about March, afterwards pricking the seedlings out when large enough.

C. macrostyla. — A beautiful bushy annual 1–2 ft. high, native of the Taurus Mountains. Leaves ovate-oblong or lance-shaped, hairy, roughish. Flowers in July, erect, about 2 in. across, purple, beautifully veined with violet, and remarkable for a long thick club-like protruding style.

Culture &c. as above. The seeds of this pretty annual may be sown in gentle heat in March and the seedlings pricked out when large enough to handle, afterwards transferring to the open border in May. Seeds may also be sown out of doors where the plants are to bloom in April and May, and the seedlings thinned out about 9–12 in. apart.

C. Medium (*Canterbury Bell*). — A beautiful bushy biennial 2–4 ft. high, native of S. Europe, with roughish hairy stems and sessile ovate lance-shaped bluntly toothed leaves. Flowers in June and July, of various colours—blue, white, purple, pink &c., broadly bell-shaped, inflated at the base, lobes more or less reflexed.

The variety *calycanthema* is remarkable for the way in which the calyx of the flowers has been developed into a coloured body like a second or even third corolla. This duplication of corollas has given rise to the *Cup and Saucer* and *Hose-in-Hose* varieties now so well known.

Culture and Propagation.—Seeds of Canterbury Bells are best sown thinly in April in the open border, or in shallow boxes under glass. The seedlings when large enough may be transplanted to a shady border and well watered. In September they may be again transplanted where they are to bloom in the flower borders the following season. The plants should be at least 2 ft. apart. Seeds are produced in abundance.

C. mirabilis. — A beautiful Caucasian species 1–2 ft. high, with rather straggling hairy stems, and roundish toothed leaves. Flowers in June and July, 2 in. across, broadly bell-shaped, pale blue, erect, in loose panicles. Ripens seed freely.

Culture &c. as above. This remarkable species has been only a few years in cultivation, and has proved to be perfectly hardy, at least in the Thames Valley. It ripens seeds freely, and in favourable positions the young plants come up all round the parent, and may be transplanted in spring.

C. nitida (*C. planiflora*). — A North American species 3–9 in. high, with rosettes of leathery dark shining green oblong crenate leaves. Flowers in summer, blue or white, bell-shaped rotate, in spiked racemes.

Culture &c. as above.

C. nobilis.—A noble Chinese species 1½–2 ft. high. Lower leaves long-stalked ovate, toothed, upper ones lance-shaped sessile or nearly so, all hairy. Flowers in July, reddish-violet, creamy, or white, spotted, 3 in. or more long, drooping, crowded near the ends of the branches. The white-flowered form is rather better known than the species.

Culture &c. as above. In northern parts of the kingdom it is advisable in severe winters to give a little protection to the crowns of this species as it may not prove to be perfectly hardy except in the milder parts.

C. peregrina. — A native of Mount Lebanon with angular stems about 2 ft. high. Lower leaves obovate, upper ones ovate acute, all crenate. Flowers in July, deep violet at the base, becoming paler upwards, in dense spiked racemes.

Culture &c. as above.

C. persicæfolia. — A fine European species 1–3 ft. high, now naturalised in the woods of Yorkshire and Banffshire. Leaves 3–4 in. long, narrowly lance-shaped. Flowers in June and July, blue, large, broadly bell-shaped, 3 together in the axils of the upper leaves, the middle one opening first. There are some fine varieties, the best being *alba*, pure white; *alba coronata*, white semi-double; *alba fl. pl.* double white; *alba grandiflora* and *alba maxima*, large pure white, 2½–3 in. across. There are also semi-double and double blue varieties.

Culture and Propagation. — After flowering the plants may be divided carefully and placed in nice sandy loam. In spring cuttings may be rooted under glass, or every young growth will make a good strong plant. Plants may also be raised from seeds as stated above under the general instructions, p. 562.

C. petræa.—A native of the Maritime and Tyrolese Alps, with tufts of downy leaves, and yellow flowers in summer.

Culture &c. as above. This should be grown in dry sunny parts of the rockery, and may be increased by cuttings or seed in spring.

C. **portenschlagiana** (*C. muralis*).—A native of S. Europe 3-4 in. high, with rounded bluntly toothed leaves, and masses of pale purple bell-shaped flowers in June and July.

Culture &c. as above. An excellent rock or wall plant in crevices.

C. **primulæfolia.** — A hairy-stemmed Portuguese species 1-3 ft. high. Lower leaves unequally and doubly crenate, lance-shaped, bluntish; upper ones ovate oblong acute. Flowers in July, blue or purple, bell-shaped rotate, with a whitish downy base, arranged in spiked racemes.

Culture &c. as above.

C. **pulla.**—A charming deciduous rock plant 3-6 in. high, native of the Austrian Alps. Lower leaves shortly stalked ovate roundish, upper ones sessile ovate, acute. Flowers in June, violet-blue, bell-shaped.

Culture &c. as above. Thrives in sandy peat and leaf soil, and goes to rest until spring after flowering.

With this species may be associated *C. G. F. Wilson*, a beautiful hybrid about 1 ft. high, between *C. pulla* and *C. carpatica turbinata.* Flowers deep blue. There is a form with smaller flowers and somewhat yellowish leaves.

C. **punctata.** — A Siberian and Japanese hairy species about 1½ ft. high, nearly related to *C. nobilis*. Leaves ovate acute, somewhat crenate. Flowers drooping, cylindrical, whitish spotted with red within.

Culture &c. as above.

C. **pusilla** (*C. modesta; C. pumila*).—A pretty Swiss species rarely exceeding 4 in. high. Leaves tufted, heart-shaped, toothed, deep shining green. Flowers in July and August, drooping, pale or dark blue, in racemes. The variety *alba* has pure white flowers; *pallida* is a paler blue form.

Culture &c. as above. Best in moist sandy soil.

C. **pyramidalis** (*Chimney Bell Flower*). A vigorous perennial 4-6 ft. high, native of Carniola and Dalmatia, with broad ovate oblong, somewhat heart-shaped glandularly toothed leaves. Flowers from July to September, pale blue, 3 together in the axils of the upper leaves or bracts, forming a dense erect pyramidal raceme. The variety *alba* has pure white flowers.

Culture &c. as above. This species and its variety are largely grown as pot-plants for conservatory decoration. Seeds are sown every year and the plants are treated as biennials.

C. **Raineri.**—A compact sturdy rock plant 2-3 in. high, native of Switzerland, Italy &c. Leaves almost stalkless, ovate, downy, slightly toothed. Flowers in June, blue, erect, 1-3 on a stem.

Culture &c. as above. This species requires fine sandy soil in warm corners of the rockery. Slugs are very fond of it in some gardens, and a watch should be kept for them in spring when the young growths are appearing. A little soot and lime around the tufts will prevent them.

C. **ramosissima** (*C. Loreyi*).—An annual species native of Greece, 6-12 in. high. Leaves sessile glaucous obovate or ovate lance-shaped crenate, or linear above. Flowers in June, pale blue with a white base. There is a pure white-flowered variety.

Culture &c. as above. Raised from seeds every year.

C. **rapunculoides.** — A European species 2-4 ft. high, with roughish ovate pointed crenate or serrulate leaves, sessile above, shortly stalked below. Flowers in June and July in branched spikes, drooping, bluish-violet, slightly bearded inside, 1½ in. long. The variety *trachelioides* has stems, leaves, and calyx covered with stiff white hairs.

Culture &c. as above.

C. **Rapunculus** (*Rampion*).—A pretty British and European fleshy-rooted biennial 2-3 ft. high. Leaves 1-3 in. long, long-stalked, broadly ovate, obscurely toothed. Flowers in July and August, ¾ in. long, reddish-purple, blue or white, in erect panicles.

Culture &c. as above. Requires moist sandy soil.

C. **retrorsa.**—A downy tufted annual 6-8 in. high, native of Asia Minor. Lower leaves roundish obovate, upper ones oval lance-shaped. Flowers in June and July, lilac-rose.

Culture &c. as above. Seeds may be sown in cold frames or shallow boxes in September or in April, and the seedlings transplanted 9-12 in. apart in May.

C. **rhomboidalis** (*C. rhomboidea*).—A European species 1-2 ft. high, with sessile ovate - acute, serrate leaves. Flowers in July, blue, drooping, in loose racemes.

Culture &c. as above.

C. rotundifolia (*Bluebell; Harebell*). A pretty British Harebell 6–12 in. high. Lower leaves stalked, roundish heart-shaped, crenately toothed; upper ones linear or lance-shaped. Flowers from June to August, deep blue, drooping. The variety *alba* has white flowers; and the variety *Hosti* is rich blue, larger than the type, and with upper linear pointed leaves, sometimes 3–4 in. long.

Culture &c. as above.

C. sarmatica. — A native of the Caucasus with downy stems 1–2 ft. high. Lower leaves stalked, heart-shaped, rather hastate, crenately toothed; upper ones ovate-lance-shaped, serrate. Flowers from May to July, pale violet-blue, nodding, in loose, one-sided racemes.

Culture &c. as above.

C. saxatilis.—A very rare rock plant 6 in. high, native of Crete. Leaves tufted ovate-spoon-shaped, crenate. Flowers in May, blue, nodding, 3–5 in a loose raceme.

Culture &c. as above.

C. Scheuchzeri. — A native of the S. European Alps 3–6 in. high. Lower leaves broadly rounded, ovate or heart-shaped, serrate; upper ones linear. Flowers in July and August, deep blue, drooping, broadly bell-shaped, on slender stems.

Culture &c. as above.

C. Scouleri. — A native of N.W. America about 1 ft. high, with long-stalked ovate or ovate-lance-shaped, coarsely toothed leaves. Flowers in July and August, pale blue, in panicles.

Culture &c. as above.

C. sibirica.—A hairy biennial 1–1½ ft. high. Widely distributed through E. and S. Europe. Lower leaves stalked, bluntly obovate, crenate; upper ones oblong lance-shaped, pointed, wavy. Flowers in July, bluish-violet, drooping, about 1 in. long.

The variety *divergens* (*C. spathulata*) has rather large violet flowers, somewhat erect at first but drooping when expanded. The variety *eximia* is dwarf and compact in habit, with pale blue or violet flowers.

Culture &c. as above.

C. soldanellæflora. — A curious temperate European species about 1 ft. high, with long, linear acute, sessile leaves. Flowers in June, blue, semi-double, with deeply cut lobes.

Culture &c. as above. Closely related to *C. rotundifolia.*

C. speciosa. — A Pyrenean species 1–1½ ft. high. Lower leaves sessile, linear lance-shaped, in rosettes; upper ones linear. Flowers in June and July, blue, purple, or white, about 1 in. long, bearded inside, arranged in a pyramidal raceme.

Culture &c. as above.

C. spicata. — A European biennial 1–2 ft. high. Lower leaves downy, crowded, sessile, linear lance-shaped; upper ones linear pointed. Flowers in July, violet-blue, stalkless, 1–3 from each bract in long spikes.

Culture &c. as above.

C. stricta. — An Armenian biennial 1–2 ft. high. Leaves hairy, ovate-lance-shaped acute, serrate. Flowers in July, blue, tubular, few, in spikes.

Culture &c. as above.

C. thyrsoides. — A hairy biennial 1–1½ ft. high, native of the Alps and Carpathians. Leaves entire, hairy, in rosettes; lower ones bluntly-lance-shaped; upper ones linear lance-shaped acute. Flowers in July, pale yellow, sessile, oblong, in dense pyramidal spikes.

Culture &c. as above. Should be grown in lime rubble in well-drained sunny parts of the border or rockery.

C. tommasiniana. — A handsome Italian alpine 9–12 in. high, with more or less drooping stems. Leaves sessile or nearly so, linear lance-shaped, pointed, serrate. Flowers in July and August, pale blue, tubular, slightly angled, in closely set axillary cymes.

Culture &c. as above. This is closely related to *C. waldsteiniana*, and is sometimes regarded as a variety of it.

C. Trachelium. — A handsome and vigorous European species 2–3 ft. high, with angular stems, and roughish, heart-shaped, coarsely toothed, Nettle-like leaves, lower ones stalked, upper sessile. Flowers in July, blue, large, in leafy racemes, 2–3 together, sometimes solitary. The variety *alba* has white flowers; *alba plena*, double white; and *flore pleno*, a double blue form.

Culture &c. as above.

C. trichocalycina.—A vigorous European species 1–3 ft. high, with shortly stalked, ovate-acute, coarsely toothed leaves. Flowers in July, blue, 1–3 in the axil of each bract, in terminal spikes.

Culture &c. as above.

C. versicolor. — A native of Greece 3–4 ft. high, with ovate-heart-shaped, toothed leaves, lower ones stalked, upper sessile. Flowers from July to September, deep violet, paler in the middle, bell-shaped rotate, in long spiked racemes. There is a variety called *Rosani.*

Culture &c. as above.

C. waldsteiniana.—A Hungarian rock plant 4–6 in. high, with greyish lance-shaped, serrate leaves, lower ones blunt, upper pointed. Flowers in June, violet-blue, erect.

Culture &c. as above.

C. Warleyi.—This pretty little Bell Flower, about 6 in. high, recently originated in the garden of Miss Wilmott, Warley Place, Essex, and may possibly be a hybrid between *C. isophylla* and a variety of *C. carpatica.* Lower leaves with stalks about 2 in. long, and roundish heart-shaped coarsely toothed blades; upper ones shortly stalked, lance-shaped. Flowers in July, bright purple, rotate, with 2 alternating corollas.

Culture &c. as above.

C. Zoysi. — A pretty little alpine, about 3 in. high, native of Carniola. Leaves crowded, ovate-spoon-shaped or obovate-lance-shaped, upper ones linear. Flowers in June, drooping, pale blue, with deeper lines.

Culture &c. as above. Should be grown in sunny crevices in rich sandy soil.

SPECULARIA (Venus's Looking-Glass).—A genus of 8 species of erect or decumbent, hairy or smooth, annual herbs, with alternate entire or toothed leaves. Flowers axillary, sessile, or shortly stalked, the upper ones in panicles. Calyx tube adnate, oblong or linear, limb 5-parted. Corolla somewhat rotate or broadly bell-shaped, 5-lobed. Stamens free. Ovary inferior 3-celled. Stigma shortly 3-lobed. Capsule oblong or linear.

Culture and Propagation. — Specularias grow in ordinary garden soil and often reproduce themselves annually from self-sown seeds. They are pretty annuals for the front of borders or rockeries and are very effective when grown in large bold masses. By sowing the seeds when ripe, and at intervals from April to midsummer, a good succession of blossom is maintained.

S. hybrida (*Corn Violet*).—A more or less decumbent British species 6–10 in. high, with ovate or spoon-shaped leaves, lower ones broadly stalked, upper ones sessile. Flowers from June to September, blue inside, lilac outside, cleft to near the middle.

Culture &c. as above.

S. pentagonia.—A native of the Levant about 1 ft. high. Leaves obovate, ovate-oblong or lance-shaped. Flowers in July, blue, with spreading lobes. There is a beautiful white-flowered variety of this species.

Culture &c. as above.

S. perfoliata.—A N. American species 3–18 in. high. Leaves roundish or ovate, stem-clasping, toothed. Flowers from May to August, purple-blue.

Culture &c. as above.

S. Speculum.—A European annual, about 1 ft. high, with more or less ovate-oblong or lance-shaped leaves. Flowers in July, purple. There are several forms of this species—the Common Venus's Looking Glass—including one with white flowers, one with double or semi-double blossoms, and one called *procumbens* with a very trailing habit which makes it valuable for the front of borders or for trailing over stones in the rockery.

Culture &c. as above.

ADENOPHORA.—A genus containing 10–15 species of pretty perennial herbs, with alternate and somewhat whorled, entire or coarsely toothed leaves. Flowers shortly stalked, nodding, in loose terminal racemes or panicles. Calyx tube adnate, ovoid or roundish; limb 5-parted. Corolla bell-shaped, 5-lobed. Stamens free. Disc epigynous, fleshy, cup-shaped or tubular. Ovary inferior, 3-celled. Stigma 3-lobed.

Culture and Propagation. — Adenophoras thrive in rich loamy soil in warm sunny positions. Owing to the fleshy nature of their roots they do not stand division well. Nevertheless if carefully divided in early autumn or spring, and the separated portions carefully planted and watered, they will make fine specimens. They ripen seeds freely, and new plants may be obtained by sowing in autumn as soon as ripe, or in spring, in a cold frame, afterwards pricking the seedlings out into light soil and finally transplanting either in autumn or spring. The plants are useful for the decoration of the rockery, or in the flower border.

A. coronopifolia.—A native of Dahuria 1–2 ft. high, with roundish heart-shaped toothed leaves, the upper ones being linear lance-shaped nearly entire. Flowers in July, blue, 8–10 in terminal racemes.
Culture &c. as above.

A. denticulata (*A. tricuspidata*).—A Dahurian species about 1½ ft. high. Lower leaves rounded toothed, stalked; upper ones sessile, ovate lance-shaped. Flowers in July, blue, small, in more or less elongated racemes.
Culture &c. as above.

A. Lamarcki.—A native of E. Europe, 1–2 ft. high. Leaves ovate lance-shaped, sharply toothed. Flowers in June, blue, in racemes.
Culture &c. as above.

A. latifolia (*A. pereskiæfolia*). — A Dahurian species 1½ ft. high. Leaves 3–5 in a whorl, ovate-oblong, pointed, coarsely toothed and ciliated. Flowers in July, blue, scattered on the upper portions of the stems.
Culture &c. as above.

A. liliifolia (*A. Fischeri*).—A Siberian species about 1½ ft. high. Lower leaves roundish heart-shaped toothed; upper ones sessile, ovate lance-shaped, coarsely toothed. Flowers in August, blue or whitish - blue, sweet - scented, in loose pyramidal panicles.
Culture &c. as above.

A. stylosa. — A native of E. Europe 1–1½ ft. high. Lower leaves obovate, sinuate; upper ones ovate pointed, smooth. Flowers in May, pale blue, in loose racemes.
Culture &c. as above.

A. verticillata.—A native of Dahuria, 2–3 ft. high. Leaves in whorls, roundish, toothed below; ovate-lance-shaped above. Flowers in June, pale blue, small, irregularly scattered on the upper portions of the stems.
Culture &c. as above.

SYMPHYANDRA.—A genus with 7 species of perennial herbs having broad, often heart-shaped toothed leaves, the lower ones long-stalked, the upper alternate, few or small. Flowers in loose panicles or racemes, often nodding. Calyx-tube adnate hemispherical or turbinate; limb deeply 5-lobed or parted; sinuses naked, or dilated into reflexed appendages. Corolla bell-shaped, 5-lobed. Stamens free from the corolla; anthers united round the style. Ovary inferior 3-celled. Stigma 3-lobed.

Culture and Propagation. — These plants like a rich sandy well-drained loam and situations partially shaded from the mid-day sun. They are increased by seeds sown in spring or in autumn when ripe in cold frames; by cuttings of the young shoots in sandy soil in spring and early summer; or by dividing the roots in early autumn or spring. The plants may be grown in the rockery or flower border and are effective if two or three are placed together about 18 in. apart.

S. Armena. — A native of Eastern Europe, about 2 ft. high, with whitish downy ovate acute deeply serrated leaves. Flowers in June, blue, solitary, erect.
Culture &c. as above.

S. Hoffmani. — A showy Bosnian species 1–1½ ft. high, with lance-shaped sharply toothed leaves. Flowers in summer, large, white, drooping, bearded inside, over 1 in. long, tubular. Calyx leafy, with 5 lance-shaped sepals half as long as the corolla.
Culture &c. as above.

S. pendula. — A showy Caucasian perennial about 2 ft. high, with drooping hairy branches and ovate acute toothed downy leaves. Flowers in July, creamy-white, funnel-shaped. Calyx lobes lance-shaped.
Culture &c. as above.

S. Wanneri (*Campanula Wanneri*). A native of Transylvania about 6 in. high, with downy lance - shaped unequally toothed leaves. Flowers in summer, blue, borne in the axils of the leaves and at the ends of the shoots.
Culture &c. as above.

TRACHELIUM (THROATWORT). — A genus of 4–5 species of smooth and hairy perennial herbs or bushes. Flowers in umbels or panicles. Calyx tube adnate ovoid or roundish, angled; limb 5-parted. Corolla narrowly tubular, shortly 5-lobed. Stamens free. Ovary inferior, usually 3-celled. Style ultimately protruding; stigma 2–3-lobed, fleshy.

T. cæruleum. — A bushy perennial 1–2 ft. high, native of Italy and Spain. Leaves ovate acute, shortly stalked, deeply toothed. Flowers from June to August, violet-blue, salver-shaped, with a long narrow tube. The variety *album* has white flowers.

Culture and Propagation.—This species likes sandy loam and leaf soil, and is best grown in warm corners of the rockery. It has an elegant bushy habit, and when covered with its trusses of blue flowers is very effective. It is increased by seeds sown in gentle heat in March, or in cold frames in autumn as soon as ripe; or by cuttings of the young shoots in early summer, inserted in sandy soil under glass. The roots may also be utilised for the purposes of increase.

Series II. HYPOGYNÆ (see p. 125).

LXIV. VACCINIACEÆ—Cranberry Order

This order consists of 26 genera and 320 species of erect or prostrate, often epiphytical shrubs or small trees. Leaves alternate or scattered, sometimes in two rows, sessile or stalked, usually evergreen, entire, crenate or serrate, teeth sometimes gland-bearing. Stipules none. Flowers hermaphrodite, regular or nearly so. Calyx adnate to the tube of the ovary; limb 5-, rarely 4–7-lobed or parted. Corolla gamopetalous, round, bell-shaped, tubular or inflated, 5-, rarely 4–7-lobed. Stamens twice as many, rarely equal in number to the lobes of the corolla. Ovary inferior 2–10-celled, crowned with an epigynous disc. Fruit a berry, rarely a drupe, or dry, often very fleshy.

GAYLUSSACCIA.—A genus containing about 40 species of smooth or downy shrubs or bushes having entire or serrate, evergreen or rarely deciduous leaves. Flowers small, white, or scarlet, borne in few- or many-flowered racemes in the leaf axils. Calyx tube obconical or top-shaped, 5-lobed or toothed. Corolla more or less urn-shaped or tubular bell-shaped, with a round or 5-ribbed tube, and 5 small erect or reflexed lobes. Stamens 10. Ovary 5-celled. Fruit small, baccate.

Culture and Propagation. — Gaylussaccias are closely related to and often mixed up with the Vacciniums, and require practically the same cultural treatment. They flourish in moist peaty soil and may be grown in front of Rhododendrons and Azaleas, or with dwarfer members of the Heath order (p. 574). The plants may be increased from seeds sown as soon as ripe or in spring on the surface of fine sandy peat and loam, and require little or no covering, owing to their small size. New plants may also be obtained by layering the branches in autumn and detaching them the following spring if well-rooted. Cuttings of the roots about a couple of inches long will also often produce plants if placed in sandy soil in brisk bottom heat in early spring.

G. dumosa (*Vaccinium dumosum*).—A deciduous N. American shrub 2–6 ft. high with entire obovate oblong thickish green leaves, and white or rosy bell-shaped flowers produced in long racemes in June and July, followed by black berries in autumn.

Culture &c. as above.

G. frondosa (*Vaccinium frondosum*). A slender-branched deciduous N. American shrub 3–6 ft. high, with entire obovate-oblong pale green leaves, with a blue-green under surface. The drooping greenish-purple roundish bell-shaped flowers appear in May and June in loose racemes, and are succeeded in autumn by deep blue glaucous berries which have an agreeable flavour.

Culture &c. as above.

G. resinosa (*Vaccinium parviflorum; V. resinosum*).—A deciduous N. American shrub 1–3 ft. high, with entire oval or oblong leaves which, when young, are covered with resinous globules. The reddish conical or cylindrical flowers are produced in short one-sided racemes in May and June, and are followed by black smooth sweet-tasting berries.

Culture &c. as above.

VACCINIUM (BILBERRY; BLUEBERRY; CRANBERRY; HUCKLEBERRY). — A genus containing about 100 species of shrubs, rarely trees or epiphytes, with persistent, rarely membranous or deciduous leaves, often thick and leathery, entire or serrate. Flowers in axillary or terminal racemes or clusters rarely solitary. Calyx lobes 4–5. Corolla urn-shaped, bell-shaped, or rarely tubular or conical, round, very rarely ribbed or angled, limb 4–5-lobed or toothed. Stamens 8 or 10, free. Ovary 4–5-celled. Fruit a berry.

Culture and Propagation. — Vacciniums all like a moist peaty soil and semi-shady places in rockeries or beds. They may be increased by seeds sown under glass on the surface of sandy loam and covered with wet moss. They may germinate in a couple of months or may remain dormant for a much longer period. Layers may also be made during the autumn months. Cuttings of the roots, 2–3 in. long, in early spring often strike in bottom heat.

Except where otherwise stated all the species described below are natives of temperate North America, and flower in spring or early summer. The berries are sweetish or acid, mostly edible, and ripen in late summer and autumn. Like Rhododendrons the plants do not like anything in the shape of lime mixed with the soil, and they may therefore be grown with such plants and others belonging to the Heath order.

V. arboreum (*V. diffusum*).—*Farkleberry.*—A tree 6–25 ft. high, with obovate or roundish oval shining green leaves, and a profusion of white flowers. Berries black, small, round.

Culture &c. as above.

V. cæspitosum.—A dwarf tufted rock plant 3–6 in. high, with obovate, thickly serrulate bright green leaves, and rosy or nearly white flowers. Fruit blue, sweet.

Culture &c. as above.

V. canadense.—A dwarf shrub 9–12 in. high, with elliptic or oblong lance-shaped, downy entire leaves, and clusters of greenish-white flowers.

Culture &c. as above.

V. corymbosum. — A shrub 5–10 ft. high, with ovate oblong or elliptic leaves, and yellow-green branchlets. Flowers white or rose, in racemes or corymbs. Berries blue-black, with a copious bloom. The variety *amœnum* has ciliated, bright green downy leaves; *pallidum* (*V. albiflorum*) is a pale and glaucous, somewhat downy form.

Culture &c. as above.

V. crassifolium.—A trailing evergreen species, with slender stems 2–3 ft. long, and oval or narrowly oblong, shining green leaves, ¼–½ in. long, and nearly white, roundish bell-shaped flowers, in axillary clusters. Berries black.

Culture &c. as above. Suitable for clambering over rocks or boulders in the rock garden.

V. formosum.—A pretty shrub 2–3 ft. high, with ovate or oblong, entire, bright green leaves 1–2 in. long, and rosy, cylindrical flowers in loose clusters. Calyx and bracts reddish.

Culture &c. as above.

V. leucostomum. — A smooth evergreen shrub 2–3 ft. high, native of the Peruvian Andes, with erect angled branches. Leaves nearly sessile, ½–1 in. long, oblong, slightly crenate. Flowers scarlet, tipped with white, somewhat bell-shaped, 3–4 in a short, erect cluster.

Culture &c. as above.

V. Mortinia.—A tender shrub 2-3 ft. high, native of the Andes. Leaves shortly stalked, ½–¾ in. long, ovate or lance-shaped oblong, crowded. Flowers rosy-pink, ⅓ in. long, with 5 small recurved teeth, in short drooping racemes.

Culture &c. as above.

V. Myrsinites (*V. Sprengeli*). — An evergreen shrub 1–2 ft. high. Leaves ½–1 in. long, obovate or oblong lance-shaped, shining green above, paler or glaucous beneath. Flowers white or rosy, with reddish bracts, in clusters or very short racemes. Berries blue, round.

Culture &c. as above.

V. myrtilloides.—A shrub 1–5 ft. high, with slightly angled branches, and ovate or oval and oblong, sharply toothed leaves 1 inch or more long. Flowers yellowish or greenish - white, tinged with purple, roundish urn-shaped. Berries purple-black, rather acid. Native of N. America.

Culture &c. as above.

V. Myrtillus (*Bilberry; Blueberry; Common Whortleberry*).—A native of the British Islands, and the N. temperate zone generally, 6–24 inches high. Leaves ovate serrate, ½-1 in. long, rosy when young. Flowers rosy, tinged with green, ¼ in. across, solitary. Berries dark blue, glaucous, ⅓ in. in diameter, used for preserves.

Culture &c. as above.

V. nitidum.—A somewhat spreading evergreen shrub, 1-2 ft. high. Leaves thick, leathery, shining, obovate or oblanceolate oblong, ¼-½ in. long, obscurely toothed. Flowers rosy or whitish, in clusters or very short racemes. Berries black, somewhat pear-shaped.

Culture &c. as above.

V. ovatum. — A stiffish evergreen shrub, 3-5 ft. high. Leaves bright green on both sides, 1 in. or so long, thick and firm, oblong obovate, or oblong lance-shaped, acute, minutely and sharply toothed. Flowers rosy or flesh-coloured, in short, dense axillary clusters. Berries reddish at first, black afterwards, sweetish.

Culture &c. as above.

V. padifolium (*V. maderense*). — A somewhat tender shrub, about 6 ft. high, native of Madeira, with oblong serrulate leaves, downy beneath. Flowers greenish-white, drooping, in leafy racemes.

Culture &c. as above. In the colder parts of the kingdom this species is likely to be injured by severe frosts.

V. pennsylvanicum. — A warty-stemmed shrub 9-12 in. or more high. Leaves oblong lance-shaped or oblong, with bristly teeth. Flowers white or slightly rosy, in clusters or short racemes. Berries bluish-black, glaucous, large and sweet. The variety ***angustifolium***, known as 'Bluets,' seldom reaches more than 9 in. high, and has lance-shaped leaves.

Culture &c. as above.

V. stamineum (*Deerberry; Squaw Huckleberry*).—A shrub 2-3 ft. high. Leaves oval, or lance-shaped oblong, dull green or glaucous. Flowers dull purple or yellowish-green, nearly all axillary. Berries greenish or yellowish, large pear-shaped or round, mawkish tasting.

Culture &c. as above.

V. uliginosum.—A British and Arctic shrub with trailing stems 6–10 in. long. Leaves obovate or oblong, ½–1 in. long, entire, leathery, glaucous beneath. Flowers pale pink. Berries dark blue, glaucous. A useful rock plant.

Culture &c. as above.

V. virgatum. — A somewhat downy shrub, about 3 ft. high. Leaves more or less obovate oblong, pointed, minutely toothed, 1 in. or more long. Flowers rosy, on short stalks, in twiggy clusters. Berries black, sometimes with a bloom. The variety ***tenellum*** is a dwarf form, with small leaves, and nearly white flowers, in shorter and denser clusters than the type. *V.* ***fuscatum*** is a form with deep rosy flowers having red stalks and bracts.

Culture &c. as above.

V. Vitis-Idæa (*Brawlins; Cowberry; Flowering Box*).—A British evergreen, with wiry, tortuous, trailing stems 6–18 in. long. Leaves obovate, dotted beneath, glossy green above (like Box), very leathery, ½–1¼ in. long, entire or bluntly and minutely toothed. Flowers pink, crowded in short terminal drooping racemes. Useful for the rockery.

Culture &c. as above.

OXYCOCCUS (CRANBERRY). — A genus with only a couple of species of very smooth, decumbent or somewhat erect shrubs, with small, alternate, evergreen, entire leaves. Flowers axillary or terminal, solitary or few, long-stalked, nodding or drooping. Characters of the flower the same as in *Vaccinium*, except that the anthers of the stamens are united in a cone instead of being free.

Culture and Propagation.—The two species described below thrive in swampy peaty soil, and are therefore best grown near the water, or in bog gardens, where they are always likely to have plenty of moisture. They will grow fairly well in peaty soil with Vacciniums and with Heaths and other Ericaceous plants, but do not grow so quickly as in moister places. They may be increased in the same way as *Vacciniums* from seeds sown when ripe or in spring, and also by layering the stems, which root freely at the joints. Cuttings of the young shoots will also root under a bell-glass.

O. macrocarpus (*Vaccinium macrocarpum*). — *American Cranberry.* — A creeping slender-stemmed N. American species, with elliptic oblong blunt leaves, glaucous beneath. Flowers in spring, pink. Fruits red, largely used for preserves.

Culture &c. as above.

O. palustris (*Vaccinium Oxycoccus*).—*Common Cranberry.* — A native of the

British Islands and the North temperate zone. Stems thread-like, creeping. Leaves about ½ in. long, ovate, entire, acute, smooth, glaucous beneath. Flowers in May, pink, with oblong segments. Fruit dark red, with a strong acid taste.

Culture &c. as above.

LXV. ERICACEÆ—Heath Order

A natural order containing over 50 genera and 1000 species of bushes, shrubs, or trees. Leaves alternate, opposite, or whorled, often persistent and jointed with the branches. Stipules none. Inflorescence various. Flowers regular, hermaphrodite. Calyx free, 4–5-cleft. Corolla hypogynous, regular, very rarely somewhat irregular or 2-lipped, usually 4–5-cleft, or with the petals free, and the lobes imbricated, twisted, or rarely valvate. Stamens hypogynous, 4, 5, 8, or 10, or twice those numbers. Ovary superior, 2–12-celled. Fruit a capsule, drupe, or berry.

ARBUTUS (Strawberry Tree).—A genus with about 10 species of smooth-stemmed small trees or shrubs, having evergreen alternate stalked entire or small-toothed leaves. Flowers small, in racemes, panicles, or clusters. Calyx free, 5-parted. Corolla round or ovoid-urn-shaped, 5-toothed. Stamens 10. Disc tumid 10-angled, ovary 5-celled. Stigma obscurely 5-lobed. Fruit a round, smooth or warty 5-celled, many-seeded berry.

Culture and Propagation. — Strawberry Trees thrive in light sandy or peaty soil, in the warmer parts of the country, although the common kind *A. Unedo* will stand a few degrees of frost in Scotland. They are usually increased from seeds, which should be sown in sandy soil in March, in gentle heat or cold frames. The choicer kinds may also be grafted or budded on stocks of *A. Unedo* in spring. The branches may also be layered in autumn. They are ornamental subjects for the lawn or shrubbery, and look very pretty when in bloom and fruit.

A. Andrachne.—An ornamental tree 10–15 ft. high, native of Greece. Leaves oblong bluntish, entire, or slightly toothed, smooth. Flowers in March and April, greenish-white, in erect terminal panicles clothed with a clammy down.

Culture &c. as above.

A. hybrida. — A graceful shrub or small tree, somewhat variable in character, and supposed to be a hybrid between *A. Unedo* and *A. Andrachne*. It has deep shining green leaves, and produces during the winter months—from Christmas to February — short drooping clusters of whitish blossoms at the tip of almost every shoot. Owing no doubt to its hybrid origin there are many more or less distinct forms in cultivation, and these are often regarded as *A. Andrachne*, the true form of which is not so common as is generally supposed. Among the most distinct forms may be mentioned *magnifica*, *photiniæfolia*, *Rollisoni* and *Milleri* with large leaves and pink flowers, and *serratifolia* with narrower and distinctly toothed leaves, and large clusters of yellowish flowers.

Culture &c. as above.

A. Menziesi (*A. procera*).—A beautiful N. American tree 6–10 ft. high, with long-stalked, broadly oval entire smooth Laurel-like leaves. Flowers in September, white, in dense terminal racemes and panicles.

Culture &c. as above.

A. Unedo (*Strawberry Tree*). — A native of the S.W. of Ireland and S. Europe, 8–12 ft. high. Leaves oblong lance-shaped, finely toothed, smooth, shining green. Flowers in September, white, or tinted with red, drooping, in terminal clusters. Fruits roundish, red, granular, like small Strawberries, edible when perfectly ripe. There are several forms, among which may be mentioned *coccinea* and *rubra*, one with scarlet, the other with red flowers; *microphylla*, with leaves smaller than in the type; *Croomei*, with large leaves, reddish-pink flowers, and brownish-red bark on the young stems.

Culture &c. as above.

ARCTOSTAPHYLOS (BEARBERRY).—A genus with about 15 species of depressed or erect bushes or shrubs, with usually evergreen, leathery, entire or serrate leaves. Flowers in nodding terminal racemes or panicles. Characters as in Arbutus. Fruit a roundish smooth or granular drupe or berry with 5 stony seeds.

Culture and Propagation.—This is practically the same as for *Arbutus*. The Bearberries flourish in sandy or peaty soil, but are much hardier than the Strawberry trees. They may be increased from seeds sown in cold frames when ripe, or in gentle heat in spring. The seeds being small require but little covering, and the seedlings may be pricked out when large enough to handle easily with the help of a fine dibber. The branches may also be layered in autumn, and by this means strong plants will be produced in due course.

A. alpina (*Arbutus alpina*). — *Black Bearberry.* — A procumbent trailing Scottish shrub with wrinkled obovate acute serrate deciduous leaves 1–1½ in. long. Flowers in April, white or flesh-coloured, on rather hairy stalks.

Culture &c. as above.

A. tomentosa. — A somewhat hairy shrub, about 4 ft. high, native of N.W. America. Leaves oval acute, somewhat lobed at the base, shortly stalked, downy beneath. Flowers in December, pure white, somewhat bell-shaped.

Culture &c. as above.

A. Uva-ursi (*Arbutus Uva-ursi*).—A British trailing evergreen, with obovate entire leathery shining leaves ½–1 in. long. Flowers in April, pink, urn-shaped, bearded within, in small terminal clusters. *A. californica* is a recently introduced variety from California. It has a trailing habit with ovate leathery leaves, and short racemes of reddish flowers.

Culture &c. as above.

A. nitida and **A. pungens**, both dwarf Mexican shrubs, with white flowers, may prove hardy enough in the mildest parts of the S. of England and Ireland.

PERNETTYA.— A genus containing about 15 species of rigid smooth, hairy, or ciliated bushes or shrubs. Leaves evergreen, usually small, alternate, shortly stalked, serrate, penninerved, leathery, hard. Flowers solitary in the leaf axils, or in axillary or terminal racemes. Calyx 5-parted. Corolla urceolate or globose, shortly 5-lobed. Stamens 10. Disc 10- (rarely 5-) lobed. Ovary slightly 5-lobed. Style columnar. Fruit a round 5-celled many-seeded berry.

Culture and Propagation. — Pernettyas are chiefly remarkable for the clusters of berries produced in autumn, about the size of small Cherries, and purple, white, pink, rose, crimson, purple-black &c. in colour. They thrive in moist peaty soil, with a mixture of sand and leaf mould, and are very effective in beds on the lawn. They may be increased by layering the shoots in autumn, and by sowing seeds in spring in sandy peat either in cold frames or in gentle heat, afterwards pricking the seedlings out carefully when well above the surface of the soil.

P. mucronata (*Arbutus mucronata*). *Prickly Heath.*—A wiry shrub 2–3 ft. high, native of the Straits of Magellan, with stiffish, shiny, ovate, sharply pointed, minutely toothed leaves. Flowers from May to July, white, axillary. The variety *angustifolia* has narrower leaves than the type. Many seedling varieties have of recent years been raised, and have resulted in great variation in the size and colour of the fruits, which often last well into the winter, and give a cheerful aspect to the landscape, when planted in large masses.

P. mucronata and its varieties are practically the only ones grown, although there are a few others less hardy and not so beautiful.

GAULTHERIA (AROMATIC WINTER GREEN).—A genus containing about 90 species of pretty erect or decumbent bushes or shrubs, with evergreen, usually alternate, leathery, serrate leaves. Flowers small, in axillary and terminal racemes, rarely solitary. Calyx 5-parted. Corolla urn-shaped or bell-shaped, 5-lobed. Stamens 10. Ovary 5-celled, often 5-lobed. Capsule fleshy or berry-like, often surrounded by the calyx.

Culture and Propagation. — Gaultherias thrive in moist peaty and sandy soil, in semi-shady places. The species described below may be used in the rockery or as edgings to peat borders. They may also be used for carpeting the soil in moist peaty places, where taller plants will also flourish. They may be increased by seeds sown in gentle heat or in cold frames in spring; or by layers of the ripened shoots in autumn; or by division of the plants in autumn or spring. The contrast between the bright shining green of the young leaves in spring and early summer and the very deep green of the older leathery leaves is very marked, and the beauty of the plants is enhanced when the sprays of bell-shaped blossoms on red stalks appear against such a background.

G. antipoda.—A strong-growing New Zealand shrub 3–6 ft. high with very leathery shortly stalked leaves, varying in shape from orbicular to oblong or linear lance-shaped. The small white or pinkish flowers appear in summer in the axils of the leaves or clustered near the tips of the shoots.

Culture &c. as above.

G. nummularioides. — A Himalayan trailing species, with roundish, deep green leaves, ciliate on the margins and changing to dull rose in autumn. Flowers in summer, white, sometimes tinged with pink, resembling those of Lily of the Valley in shape. Fruit scarlet.

Culture &c. as above. This is a very useful plant for covering sloping banks or for trailing over rocks and boulders, or it may be grown in large clumps in peaty soil in the front of the flower border.

G. procumbens (*Canada Tea; Creeping Winter Green*).—A procumbent N. American species with obovate, finely toothed, ciliated leaves. Flowers in July, white, few, nodding. Berries red, edible.

Culture &c. as above. The chief attraction of this species lies in the dull red or rosy tints of the foliage in autumn and winter and the numerous red fruits.

G. Shallon. — A procumbent hairy N.W. American shrub with smooth ovate, somewhat heart-shaped, serrate leaves. Flowers in May, white tinged with red, on one-sided downy racemes. Berries purple, round, fleshy.

Culture &c. as above.

G. trichophylla. — A pretty little Himalayan species 2–3 in. high, remarkable for its hairy leaves, rather large bell-shaped flowers, and in autumn its big sky-blue berries, 'which look like small blue eggs resting on the ground among the minute twigs.'

Culture &c. as above. This little trailer prefers a soil composed almost entirely of peat, and although it likes moisture the drainage must be perfect and the atmosphere pure to ensure the greatest success.

CASSANDRA.—A small genus of evergreen shrubs, with alternate, shortly stalked leaves and flowers in the axils of the upper leaves, solitary or racemose. Sepals 5, free. Corolla oblong, cylindrical, 5-toothed. Stamens 10. Ovary round, 5-ribbed and 5-celled. Capsule small.

Culture and Propagation.—Cassandras thrive in moist sandy peat and loam, and may be increased by seeds (which are very small) or by layers in the same way as the Gaultherias mentioned above.

C. calyculata (*Andromeda calyculata*). A Virginian swamp shrub, 1–3 ft. high, with elliptic oblong, bluntish leaves, obsoletely toothed, and rusty beneath. Flowers in April, pure white, or tinged with pink, in terminal leafy racemes. *C. angustifolia* (or *C. crispa*), a native of Carolina, is really a variety with linear lance-shaped, acute leaves, having somewhat wavy edges. Flowers like those of *C. calyculata*.

CASSIOPE.—A genus containing 10 species of tufted Heath-like evergreen bushes often with 4-angled, leafy stems. Leaves small entire or ciliated, 3-angled or deeply channelled behind, or flat and awl-shaped, convex behind. Flowers axillary, rarely terminal, solitary, nodding or drooping, on slender stalks. Sepals 4–5, free. Corolla bell-shaped, 5–6-lobed. Stamens 8–10–12. Ovary 4–5-celled. Capsule round.

Culture and Propagation.—Cassiopes require to be grown in thoroughly well-drained, sandy peat in parts of the rockery where they will not be fully exposed to the glare of the mid-day sun. While disliking stagnant moisture they must always have plenty of water, especially during the period of growth and in the summer months. These plants and many others belonging to the Heath order are greatly benefited by a mulching or top-dressing of fresh peaty soil and leaf mould every winter. Owing to its organic nature the soil soon becomes impoverished and washed away, and the stems of the plants are left exposed to the biting blasts of winter with injurious results. Hence the value of giving fresh soil annually, or transplanting so as to lower the stems somewhat in new soil. They are best increased by layers in autumn, the branches rooting freely when pegged down, and may be detached the following spring.

C. fastigiata (*Andromeda fastigiata*). A pretty little Himalayan shrub, suitable for rockeries. Leaves small, imbricated, in 4 rows. Flowers in May, white or pink, near the ends of the branchlets.
Culture &c. as above.

C. hypnoides (*Andromeda hypnoides*). An interesting, mossy, creeping shrub, native of Lapland and N. America, with loose needle-like imbricating leaves. Flowers in June, small, white, bell-shaped, drooping, on rather long stalks, with a red calyx.

Culture and Propagation.—To establish this species, the branches should be carefully pegged down in sharp, moist, peaty soil, as it seems to shrivel up when not actually in contact with the moist earth. An annual top-dressing of peaty soil as recommended above will prove of great value in this particular case.

C. tetragona (*Andromeda tetragona*). A pretty little Lapland evergreen 6–8 in. high, with 4 rows of closely packed, obtuse, needle-like leaves, minutely ciliated. Flowers in March, white, bell-shaped, like those of Lily of the Valley, solitary, rather freely produced.
Culture &c. as above.

LEUCOTHOË.—A genus containing about 8 species of pretty evergreen shrubs, with alternate stalked oblong or lance-shaped, serrulate, penninerved leaves, and flowers in axillary or terminal racemes or panicles. Sepals 5, free. Corolla ovoid, urn-shaped or cylindrical, 5-toothed. Stamens 10. Disc 10-lobed. Ovary 5-celled.

Culture and Propagation.—Leucothoës thrive in a sandy peaty soil with leaf-mould and always like plenty of moisture at the root, but not in a stagnant state. They may be raised from seeds sown carefully and scarcely or not at all covered with soil; and may also be increased by layers, or by dividing established plants in autumn as with the Gaultherias mentioned above, p. 575.

L. acuminata (*Andromeda acuminata*).—A pretty N. American shrub 1–2 ft. high, with ovate lance-shaped pointed shining leathery leaves. Flowers in June, white, bell-shaped, drooping, in great profusion in axillary racemes.
Culture &c. as above.

L. axillaris (*Andromeda axillaris*).—A handsome N. American shrub 2–3 ft. high, with young branches covered with a white powdery down. Leaves oblong or oval, pointed, somewhat hairy beneath. Flowers in May, white, ovoid-cylindrical in axillary spiked racemes.
Culture &c. as above.

L. Catesbæi (*Andromeda Catesbæi*).—Native of North America, 2–4 ft. high. Leaves ovate lance-shaped, tapering to a point, serrulate. Flowers in May, white, strong-smelling.
Culture &c. as above.

L. Davisiæ. — A pretty Californian shrub, 3–5 ft. high, with bluntly oblong, obscurely serrulate, bright green leaves. Flowers in May, white, drooping, in dense erect clusters. This species is also known as *L. Lobbi.*
Culture &c. as above.

L. racemosa (*Andromeda spicata*).—A fine N. American shrub 4–10 ft. high. Leaves oblong or oval lance-shaped, acute, serrulate, somewhat downy when young. Flowers in May and June, white, in erect clusters.
Culture &c. as above.

L. recurva (*Andromeda recurva*).—A distinct N. American shrub, somewhat straggling in habit, and having the tips of the branches tinged with scarlet. Leaves oval lance-shaped, pointed. Flowers in June, white, in recurved or spreading racemes.
Culture &c. as above.

OXYDENDRON (SORREL TREE).—A genus with only one species:—

O. arboreum (*Andromeda arborea*).—A beautiful tree 15–40 ft. high, native of the Eastern United States. Leaves stalked, deciduous, oblong lance-shaped, pointed, serrate, 4 6 in. long, and glaucous beneath. Flowers in June and July, white, in terminal panicles of many one-sided racemes often as much as 9 or 10 in. in length. Calyx free, 5-parted. Corolla ovoid, 5-toothed. Stamens 10.

Ovary broadly ovoid, 5-celled. Capsule small, ovoid, 5-angled.

Culture and Propagation. — The Sorrel tree thrives in moist peaty well-drained soil in somewhat sheltered situations. It is increased by imported seeds which must be sown carefully immediately on arrival on the surface of fine sandy peat, and very slightly, or not at all, covered with fine soil. It may also be increased by layers, which, however, often root with difficulty, and should not be detached until the plants can be severed with safety and a chance of their succeeding when transplanted. The leaves assume a rich bronzy-purple hue in autumn, and look very handsome.

EPIGÆA (Ground Laurel; Mayflower).—A genus with only two species of prostrate creeping, rusty-haired shrubs with alternate shortly stalked leathery evergreen leaves, and clusters of fragrant flowers in the leaf-axils. Calyx with 3 bracts. Sepals 5, scaly. Corolla hypocrateriform, with a rather broad tube bearded within; 5-lobed. Stamens 10. Disc 10-lobed. Ovary ovoid, hairy, 5-celled. Capsule 5-angled.

E. repens.—A pretty hairy N. American evergreen, with heart-shaped ovate entire leaves. Flowers in May, white tinted with red, in dense clusters, very fragrant.

Culture and Propagation. — This species grows but a few inches high, and will thrive only in moist sandy peat in shady places, as under trees or shrubs. It may be increased by seeds when obtainable, but they are slow in sprouting. Sometimes by carefully dividing the tufts in autumn, or by layering the branches, good plants are obtained. Cuttings of the previous year's wood are most successful, inserted in sandy soil under a glass in gentle heat in spring. As soon as rooted the plants should be grown on in pots until well established, and then transferred in early autumn or spring to theirpermanent positions outside.

LYONIA.—This genus (once included in *Andromeda*) contains 8 species of downy or felty trees and shrubs with alternate stalked evergreen or deciduous leaves, and small flowers in axillary clusters or racemes. Calyx free, 4–5-lobed as far as the middle. Corolla urn-shaped or globose, downy, 4–5-toothed. Stamens 8–10. Disc 8–10-lobed. Ovary 4–5-celled. Capsule hard, ovoid, 4–5-angled.

L. paniculata (*Andromeda ligustrina*).—A N. American evergreen Privet-like shrub 8–10 ft. high, with obovate lance-shaped, somewhat pointed and almost entire leaves. Flowers in June, white, roundish, in clusters.

Culture and Propagation. — Lyonias grow best in moist sandy peat or sandy loam and leafsoil, in not too sunny places. They are increased by layering the branches in autumn, or by carefully sowing the minute seeds in sandy peat, and without covering them except with a sheet of glass, which helps to keep the surface moist by retarding evaporation.

ZENOBIA.—This genus contains only one known species:—

Z. speciosa (*Andromeda cassinæfolia; A. speciosa*).—A beautiful smooth, more or less glaucous shrub 2–4 ft. high, native of the S. United States. Leaves alternate stalked, oblong or oblong lance-shaped, leathery, entire or serrulate, deciduous, 1–2 in. long. Flowers in summer, white, drooping, in axillary corymbs or clusters, like large Lilies of the Valley. Calyx free, 5-lobed. Corolla bell-shaped, with 5 broadly rounded lobes. Disc 10-lobed. Ovary 5-celled.

The variety *pulverulenta* (also known as *Andromeda dealbata* and *A. pulverulenta*) is a more showy plant than the type. The leaves are covered beneath with a conspicuous whitish glaucous bloom, and the white bell-shaped flowers are larger and more numerous.

Culture and Progagation.—*Z. speciosa* and its variety thrive in a peaty soil, and as long as there is sufficient root moisture, the plants may be fully exposed. Grown in masses or in beds on the grass it forms a very attractive sight when laden with clusters of its beautiful drooping white bells. It may be increased by carefully sowing the seeds in spring, or as soon as ripe, in gentle heat, and keeping them covered with a sheet of glass and in a shaded position until well above the surface. Fresh plants may also be obtained by layering the branches in autumn and detaching them the following spring or autumn if well rooted.

ANDROMEDA. — Although many plants described in this work under Cas-

SANDRA, CASSIOPE, LEUCOTHOË, LYONIA, OXYDENDRON, PIERIS, and ZENOBIA were at one time all called Andromedas, there is only one species which properly belongs to this genus at present, viz.:—

A. polifolia (*Wild Rosemary; Moorwort*).—A handsome smooth dwarf evergreen shrub about 1 ft. high, native of British and Irish peat bogs. Leaves about 1 in. or more long, thick, and leathery, elliptic lance-shaped, shining green above, glaucous beneath. Flowers from May to August, pinky-white, drooping, sometimes tipped with red, in umbels near the ends of the branches. Calyx deeply 4-5-parted. Corolla roundish 5-toothed. Stamens 10, with bearded filaments. Disc 10-lobed. Ovary 5-celled. Capsule roundish 5-angled.

Culture and Propagation.—The Wild Rosemary is a good plant grown in masses in moist or swampy peaty soil. There is a good deal of variation in the colour of its flowers, and two varieties, *major* and *angustifolia*, are known. The plants are increased from the minute seeds sown carefully under glass in peaty soil in autumn, giving plenty of air as soon as germination takes place. Layers of the branches are also made in autumn, but they take about 12 months to develop a sufficient quantity of roots before they can be detached from the parent plant, that is with any chance of success as to their leading a free and independent existence on their own roots.

PIERIS.—A genus containing about 10 species of smooth or downy shrubs or trees, with mostly evergreen, stalked, alternate, entire, or serrulate leaves. Flowers in axillary or terminal racemes. Calyx free, 5-parted. Corolla ovoid or cylindrical-urceolate, with 5 recurved teeth or lobes. Stamens 10. Disc 10-lobed. Ovary round, 5-celled. Capsule round, 5-lobed.

Culture and Propagation. — These plants are of the same nature as Andromedas, and require to be grown in moist peaty soil. They are increased by seeds and layers like Andromedas mentioned just above.

P. floribunda (*Andromeda floribunda; Leucothoë floribunda*).—A pretty shrub 2-6 ft. high, native of the United States. Leaves ovate oblong acute, finely toothed, smooth, leathery. Flowers in April and May, pure white, in great profusion on one-sided racemes.

Culture &c. as above.

P. formosa.—A beautiful shrub with green, leathery, somewhat puckered, lance-shaped, finely toothed leaves, and branching clusters of porcelain-white flowers.

Culture &c. as above. Being a native of the temperate Himalayas and China this shrub is not altogether proof against hard frosts in all parts of the kingdom. It may therefore be advisable to give it a little protection in the north during severe winters.

P. japonica (*Andromeda japonica*).—A handsome Japanese shrub about 8 ft. high, with dark green, leathery, lance-shaped leaves. Flowers in early summer, white, urceolate, in long drooping clusters often 6 inches in length. The variety *elegantissima* has the leaves clearly edged with creamy white and flushed with pink; it is also known as *variegata*.

Culture &c. as above.

P. mariana (*Andromeda mariana*).—A handsome deciduous shrub 2-4 ft. high, native of Maryland. Leaves leathery, oval or oblong, said to poison lambs and calves. Flowers in May and June, white, large, nodding, in drooping clusters.

Culture &c. as above.

P. nitida (*Andromeda coriacea*).—A native of the S. United States 2-6 ft. high, with ovate-oblong, entire, shiny leaves. Flowers from March to May, white, red, or purple, fragrant, in numerous axillary clusters.

Culture &c. as above.

P. ovalifolia. — A native of Nepaul, 20-40 ft. high, with oval-pointed entire leaves 2-4 in. long, downy when young, and said to be poisonous to goats. Flowers in May, pale flesh-colour, in long drooping one-sided racemes.

Culture &c. as above.

P. phillyreæfolia. — A native of W. Florida 1-2 ft. high, and too tender for any but the mildest parts of the southern coasts. Leaves oblong or lance-shaped, blunt, glandular-serrate near the apex. Flowers from January to March, white, ovoid, in loose racemes.

Culture &c. as above.

ENKIANTHUS.—A genus containing 5 species of smooth shrubs with evergreen, stalked, leathery, entire or serrulate leaves, and flowers in drooping terminal corymbs or umbels. Calyx free, with 5 short acute lobes. Corolla bell-shaped, roundish, or urceolate, with 5 entire or laciniated lobes. Stamens 10. Disc none, or small. Ovary ovoid 5-celled. Capsule ovoid or oblong, fleshy or woody, 5-angled.

Culture and Propagation. — These plants grow well in a mixture of moist sandy peat and loam, and may be increased by cuttings of the ripe shoots inserted in sandy soil in spring, under glass. They may be grown in the same way, and receive the same general treatment, as Pieris and Andromeda. See p. 579.

E. campanulatus (*Andromeda campanulata*).—A pretty Japanese shrub with elliptic, sharply toothed leaves about 2 in. long. Flowers in June, greenish-white, tinged with red, in drooping clusters.

Culture &c. as above.

E. cernuus (*Meisteria cernua*). — A Japanese bush 6–8 ft. high, with reddish bell-shaped flowers.

Culture &c. as above.

E. himalaicus. — A native of the Eastern Himalayas, closely related to *E. japonicus* and probably only a geographical form of it. It has ovate lance-shaped tapering leaves and umbels of drooping dull orange-red flowers tipped with brighter red.

Culture &c. as above.

E. japonicus. — A slender deciduous Japanese shrub, with elliptic obovate leaves which change to a beautiful deep golden-orange in autumn. Flowers in February, white, roundish, in drooping clusters.

Culture &c. as above.

CALLUNA (Heather; Common Ling).—Only one species belongs to this genus:—

C. vulgaris (*Erica vulgaris*). — This is the well-known Heath or Heather of British and Irish moors. It grows 1–3 ft. high, and has wiry woody stems covered with very short 3-angled linear oblong leaves, imbricating in 4 rows, and gibbous at the base. Flowers from July to September, small, numerous. rosy-pink, shining, axillary, in long spiked racemes. Sepals 4. Corolla bell-shaped, 4-lobed. Stamens 8, free.

There are several distinct forms of the Common Heather, the best being *alba*, *Hammondi*, *minor*, and *pilosa*, all white-flowered forms; *Alporti*, crimson, and *Alporti variegata*, with variegated leaves; *argentea*, silvery-leaved; *aurea*, yellow-leaved; *flore pleno*, with double rosy flowers; *pumila* and *dumosa*, with dwarf mossy growth; and many others with names more or less descriptive of their peculiarities.

Culture and Propagation.—There are few sights so pretty as masses of Heather when in bloom, and in large gardens on the sides of knolls or banks or on level or undulating ground a very effective display can be made. Although perhaps best in sandy peaty soil, the Common Heath will grow well in sandy loam with plenty of vegetable matter like leaf-soil in it. In a wild state seeds are sown naturally and young plants raised by that means alone. They may also be raised from seeds in gardens, sown carefully and without any covering of soil as they are so minute; or by layers in autumn. Cuttings of the tops placed under bell-glasses in very fine sandy peat in spring will also root. The young plants in all cases require to have the tips of the shoots pinched out so as to induce a bushy and sturdy habit by the development of side branches.

PENTAPERA.—This genus differs from Erica chiefly in having the parts of the flower in fives instead of fours, and 10 stamens instead of 8. It contains only one species:—

P. sicula (*Erica sicula*).—A pretty Heath-like downy shrub 1–2 ft. high, native of Sicily. Leaves linear oblong, leathery, entire, about ½ in. long below, gradually shortening upwards. Flowers in May, pale pink, rather large, about 4 in a cluster at the ends of the branches. Sepals 5, ovate acute, spreading. Corolla roundish, urn-shaped, with 5 recurved lobes. Stamens 10, hypogynous, free.

Culture and Propagation.—It is somewhat rare, and is probably hardy only in the milder parts of the south. It is raised from seeds sown on the surface of fine peaty soil in spring; and may also be increased by layers in autumn; or by cuttings of the young shoots under a bell-glass in gentle heat in spring.

ERICA (Heath).—A genus containing about 400 species of much-branched evergreen shrubs or bushes with small stiffish opposite, alternate, or whorled leaves. Flowers usually nodding, axillary or terminal, in clusters or racemes. Calyx

4-parted. Corolla urn-shaped, globose, hypocrateriform, tubular or bell-shaped, 4-lobed. Stamens usually 8. Ovary usually 4-celled.

Culture and Propagation. — Only a few Heaths are suitable for outdoor cultivation in this country, and the remarks under *Calluna vulgaris* above may be applied to them. They mostly grow in peaty soil and may be increased by cuttings under bell-glasses, seeds, or layers. They are equally useful and ornamental on sloping banks or knolls, in the lower parts of the rock garden, or even in the flower border where the dwarf kinds can be made to do duty as carpet plants to contrast with taller ones that flower at different seasons.

E. arborea.—This graceful Heath is found in a wild state in Southern Europe, N. Africa, and as far south as the Canary Islands, where it attains the size of a fairly large tree. It produces white flowers, but unfortunately is too tender for general cultivation in the British Islands. In the mildest parts of the south and west it may be grown with a fair amount of success in warm situations sheltered from cold winds.

Culture &c. as above.

E. carnea.—A compact species about 6 in. high, native of Germany, with smooth linear leaves 3–4 in a whorl. Flowers from January to April, pale red or pink, in one-sided racemes. The variety *alba* (or *herbacea*) has white flowers, but is not quite so vigorous. Mixed with the type however it looks very pretty.

Culture &c. as above.

E. ciliaris (*Dorset Heath*).—A native of Dorset, Cornwall, and parts of Ireland. 6–12 in. high, with 3 ovate ciliate leaves in a whorl. Flowers from June to September, pale red, ovoid, in racemes.

Culture &c. as above.

E. cinerea (*Scotch Heather*).—A pretty British and Irish Heath 6-12 in. high, with 3 smooth linear acute leaves in a whorl. Flowers from July to September, crimson-purple, drooping. There are many forms, such as *alba*, *atropurpurea*, *atrosanguinea*, *bicolor*, *coccinea*, *pallida*, *purpurea*, *rosea* &c., with flowers varying in colour according to the name, and all very ornamental.

Culture &c. as above.

E. lusitanica (*E. codonodes*). — A charming Heath 2–6 ft. or more high, native of Spain and Portugal. The branches are clothed with slender needle-like leaves pointing upwards, and the drooping cylindrical blossoms, white or faintly tinged with pink, appear in great profusion from January to March and April according to the part of the country.

Culture &c. as above. This fine Heath is practically hardy in most parts of the kingdom and flourishes in loamy as well as peaty soil. If it should be cut down by a severe frost, it is almost sure to send up fresh shoots from the base.

E. Mackaii. — A showy plant about 1 ft. high, native of Connemara, with broad ovate leaves, green above, silvery beneath. Flowers in July and August, pale red. It is near *E. Tetralix*, and was at one time regarded as a variety of that species.

Culture &c. as above.

E. mediterranea (*E. hibernica*).—*Irish Heath.*—Found in the boggy heaths of Galway and Mayo, and also in the Mediterranean countries. It grows 4–5 ft. high. Leaves linear, usually 4 in a whorl. Flowers in April and May, pink, cylindric bell-shaped, with broad lobes, in dense racemes.

The variety *hybrida* is supposed to be a cross between *E. mediterranea* and *E. carnea.* It bears a profusion of bright pinky-purple drooping blossoms, which are very like those of *E. carnea*, and the projecting black-anthered stamens are very conspicuous. They often appear before Christmas, and according to locality may be found in good condition up to March and April in various parts of the country. It is therefore an excellent variety for winter flowering and deserves to be widely grown. The variety *alba* is also very beautiful when laden with its masses of white flowers and deep brown projecting stamens. It is, however, dwarfer and decidedly more compact in habit than *hybrida*, but the two together make a grand picture in sheltered nooks, or on the warm sides of knolls and hillocks. Like the type, it flourishes in peaty soil, but will also grow well in light sandy loam. It seeds freely, and the seedlings come up naturally.

Culture &c. as above.

E. scoparia.—A native of S. Europe 2–3 ft. high, with 3 leaves in a whorl.

Flowers greenish, roundish, in long one-sided racemes.

Culture &c. as above.

E. Tetralix (*Cross-leaved Heath; Bell Heather*).—A beautiful British and Irish plant 6–12 in. high, with a greyish appearance. Leaves linear obtuse, 4 in a whorl, downy. Flowers from July to September, rosy-red, drooping, ovoid, in umbel-like clusters at the ends of the branches. There is a white-flowered variety called *alba*, and a red one called *rubra*.

E. maweana is closely related to *E. Tetralix*. It grows 12–18 in. high, making nice bushy plants, and produces its purple-crimson flowers in autumn.

Culture &c. as above.

E. vagans (*Cornish Heath*).—A native of Cornwall, S. France, and parts of Ireland, 6 in. to 2 ft. high. Leaves linear, recurved, 3–4 in a whorl. Flowers from July to September, pink or purple, bell-shaped, long-stalked, in dense axillary racemes. There is a white variety, *alba*; also one called *grandiflora* and *rubra*.

Culture &c. as above.

LOISELEURIA.—A genus containing only one species:—

L. procumbens (*Azalea procumbens*). A distinct wiry trailing evergreen shrub native of the Scottish Alps and Alpine Europe. It forms flat patches with deep green glossy leaves about ¼ in. long, deeply channelled above, densely downy beneath, stiff, leathery, recurved, linear obtuse. Flowers in May and June, pink, small, 1–5 at the tips of the branches, on red stalks. Calyx 5-parted. Corolla broadly bell-shaped, 5-lobed. Stamens 5, slightly adnate to the corolla. Ovary roundish, 2–3-celled.

Culture and Propagation. — This is a natural rock plant, and delights in peaty soil. It may be increased by seeds carefully sown under glass in autumn or spring, or by layering the branches in autumn and severing them the following spring or early autumn, according as they are more or less well rooted. As it takes a long time to obtain plants from seeds, layering on the whole is the better and quicker process. This plant is found in great abundance on the Swiss Alps, and plant-hunters often imagine that good clumps can be successfully transplanted. But such is not the case, as adult plants almost always die. Seedlings are best obtained, and when they have recovered the shock of removal may be given as much light and air as possible in the warmest and sunniest parts of the rockery.

BRYANTHUS.—A genus with 3–4 species of smooth or downy Heath-like evergreen shrubs or bushes with flowers in terminal racemes or clusters. Calyx 4–6-lobed or parted. Corolla bell-shaped with 4–6-short recurved lobes. Stamens 8–10–12. Ovary roundish, 4–5-celled, Capsules erect.

Culture and Propagation. — These plants grow well in moist sandy or peaty soil, and are chiefly suitable for the rock garden. They may be increased by seeds carefully sown on the surface of sandy soil in spring or autumn; by layering the branches in autumn; by cuttings under a bell-glass, or by carefully dividing the plants in early autumn or spring.

B. Breweri. — A recently introduced Californian dwarf evergreen shrub with clusters of narrow linear leaves, and short racemes of purple-red flowers in summer.

Culture &c. as above.

B. empetriformis (*Menziesia empetriformis*).—A native of N.W. America, about 6 in. high, with crowded linear leaves and clusters of reddish-purple flowers near the ends of the branches.

Culture &c. as above.

B. erectus.—A Siberian trailing bush about 1 ft. high, with bluntly linear, obscurely serrated leaves, and pretty pink bell-shaped flowers in summer.

Culture &c. as above.

B. Gmelini.—A native of Kamtschatka 2–3 in. high, with small denticulate leaves, and clusters of red flowers in summer.

Culture &c. as above.

DABŒCIA (St. Dabeoc's Heath; Irish Heath).—A genus with only one species:—

D. polifolia (*Menziesia polifolia*).—A beautiful Heath-like shrub 1–2 ft. high, common on the boggy heaths of Connaught. Leaves alternate, evergreen, about ½ in. long, elliptic, glossy above, white and downy beneath. Flowers from June to September, crimson-purple, drooping, in loose terminal racemes. Sepals 4. Corolla ovoid, inflated, shortly 4-lobed. Stamens 8. Ovary ovoid, 4-celled.

There is a white-flowered variety, *alba*, and a deeper purple one called *atropurpurea*, both very pretty. There is also one called *bicolor* which bears both white and purple flowers, both colours occasionally in the same flower.

Culture and Propagation.—Grown in masses St. Dabeoc's Heath is a charming ornamental shrub, and may be used with other peat-loving shrubs, many of which belong to the same order. It may be grown in moist, peaty soil with a little loam, and may be increased by layering the branches in autumn; by cuttings of the young shoots in spring under a hand-glass; or by seeds sown under glass in spring or autumn, although plants thus raised vary somewhat in character.

KALMIA (American Laurel). — A genus containing 6–7 species of beautiful evergreen shrubs with opposite, alternate or verticillate entire leaves, and flowers in axillary or terminal corymbs or racemes. Calyx 5-parted. Corolla broadly bell-shaped, or rather hypocrateriform, 5-lobed, with a funnel-shaped tube having 10 pits or hollows into which the anthers of the stamens fit. Stamens 10, with filaments at first bent backwards. Ovary roundish, 5-celled. Capsule erect.

Culture and Propagation.—Kalmias are among the most beautiful of ornamental shrubs. They like partially shaded spots and moist, sandy, peat soil, and may be associated with Rhododendrons. The plants also flourish in good and deeply dug loamy soil to which large quantities of leaf-mould have been added. Lime is more or less injurious to these plants as to Rhododendrons and many other plants of the Heath order. Its presence may be detected by taking a fair sample and pouring a little vinegar or sulphuric acid (or vitriol) on it. A fizzing noise will signify the presence of lime in the soil, otherwise there will be no apparent action. By mixing samples of the soil in rain or distilled water, or water which has been well boiled, and then blowing into it with the breath by means of a pipe or a straw, the water will assume a milky colour should lime be present, but it will remain more or less clear if lime is absent. A good mulching of well-decayed manure, or a mixture of fresh peat and leaf mould placed on the surface of the beds around the plants will be of great benefit and may be applied every winter. They may be increased by sowing the minute seeds in shallow pans of sandy peat in a cold frame as soon as ripe or in spring (the seeds require no covering of soil, but a sheet of glass over the pots or pans will greatly retard evaporation from the soil and keep a moist atmosphere); by cuttings of the young shoots under a bell-glass in sandy soil in spring; or by layering the lower branches in autumn.

K. angustifolia (*Sheep Laurel*). — A pretty Canadian shrub 2–3 ft. high, with bluntly oblong leaves 1–2 in. long, mostly in twos or threes. Flowers in early summer, purple or crimson, in lateral corymbs. The variety *pumila* is a dwarf and more compact plant; *ovata* has larger oblong or ovate glossy green leathery leaves; *nana* is a dwarf compact-growing form usually not more than a foot high; and *rubra* has very deep coloured flowers.

Culture &c. as above.

K. cuneata. — This is a recently described species not yet known in British gardens. It is a native of N. Carolina, and grows into a deciduous shrub 2–3 ft. high with slender straggling stems and ovate wedge-shaped leaves. The flowers are about ¾ in. across, creamy-white with a broad light red band at the base of the limb.

Culture &c. as above.

K. glauca.—A native of Canada 1–2 ft. high, with narrow-oblong, nearly sessile leaves, opposite or in threes, about 1 in. long, glaucous-white beneath. Flowers in April, lilac-purple, over ½ in. across, borne in clusters at the ends of the shoots.

Culture &c. as above.

K. hirsuta.—A vigorous hairy shrub about 1 ft. high, native of Virginia, Florida &c. Leaves nearly sessile, flattish oblong or lance-shaped, ¼–½ in. long. Flowers in summer, rosy-purple, about ½ in. across, scattered and axillary.

Culture &c. as above. This species seems to have dropped out of cultivation in the British Islands.

K. latifolia (*Calico Bush*).—An elegant N. American shrub 3–10 ft. high, with bright green, stalked, oblong or elliptic-lance-shaped leaves, alternate or sometimes in twos or threes. Flowers from May to July, rosy to white, crowded in corymbs at the ends of the branches.

Culture and Propagation. — This species is sometimes forced in greenhouses in early spring. Well-budded plants are potted up in winter, and brought in to gentle heat as required.

There is a variety called *myrtifolia* with small Myrtle-like leaves and a more dwarf and compact habit. The newer variety called *polypetala* resembles the type in habit of growth, but the flowers are peculiar in having the corolla cut into several segments instead of being 5-lobed as in the normal forms.

RHODOTHAMNUS (Ground Cistus).—A genus with one species:—

R. Chamæcistus (*Rhododendron Chamæcistus*).—A handsome evergreen dwarf shrub about 6 in. high, native of the Austrian Alps. Leaves shortly stalked, elliptic lance-shaped entire, shining green, bristly ciliate. Flowers in May, pink, nearly 1 in. across, solitary, on long slender stalks at the ends of the branches. Calyx 5-parted. Corolla rotate 5-lobed, with a very short tube. Stamens 10. Ovary round, 5-celled.

Culture and Propagation.—This plant grows well in damp peaty soil in shady situations, and is most suitable for the rockery. It may be increased like *Kalmias* from seeds, cuttings, or layers, and will flourish under the treatment recommended for those pretty shrubs.

LEIOPHYLLUM (Sand Myrtle). A genus with 2 species of dwarf evergreen shrubs, with small alternate clustered, very shortly stalked, entire leaves, and small flowers in terminal corymbs. Calyx with 5 rigid acute lobes. Petals 5, sessile, bluntly oblong. Stamens 10, hypogynous, protruding. Disc fleshy, 10-lobed. Ovary ovoid or roundish 2–5-celled and lobed.

L. buxifolium (*L. thymifolium; Ammyrsine buxifolia; Ledum buxifolium*).—An erect bushy evergreen 6–12 in. high, native of New Jersey and the mountains of Virginia. Leaves small, oval, smooth, shining. Flowers in May and June, white, tinged with pink at the tips and outside.

Culture and Propagation. — This species thrives in peat soil or sandy loam in moist corners of the rockery, and may be readily increased by layers in the autumn; also by seeds sown in shallow pans in cold frames when ripe, or in spring, and kept moist.

LEDUM (Labrador Tea).—A genus containing 4 or 5 species of beautiful evergreen shrubs, with alternate, shortly stalked, leathery leaves, rusty beneath, and flowers in terminal umbels. Calyx minute, 5-toothed. Petals 5, obovate, blunt, spreading. Stamens 5 or 10, rarely 6–7, protruding. Ovary ovoid, scaly, 5-celled. Capsule oblong erect.

Culture and Propagation.—Ledums thrive in moist peaty soil, or sandy loam, and are chiefly increased by layering the branches in autumn, and severing them in spring if sufficiently well rooted. The fine seeds may also be sown, but the seedlings require a good deal of attention to make them into thoroughly established plants. Large tufts may be carefully divided in autumn, and kept shaded until fairly well established in their new quarters.

L. glandulosum. — This newly introduced species is a native of California, British Columbia, and the northern Rocky Mountains, in which parts of the world it reaches a height of 2–6 feet. The ovate leaves are 1–2 in. long, glossy green above, somewhat glaucous beneath and covered with glandular dots. The rusty down or wool so conspicuous in the other species is absent in this, as are also the curved back edges. The pure white flowers each about ¾ in. across appear in May and June, and are borne in clusters at the ends of the shoots. Stamens 10.

Culture &c. as above. Although not yet well known this species promises to become a popular evergreen shrub. It seems to be somewhat quicker growing than the other species, and it is interesting to record it as having flowered for the first time in British gardens at the Royal Gardens, Kew, in 1897.

L. latifolium.—A handsome shrub 1–3 ft. high, native of the United States. Leaves linear oblong, with the edges folded back; under surface rusty-coloured. Flowers in April and May, white, in terminal corymbs. Stamens 5.

The variety *canadense* grows 3–6 in. high, with ovate stalked leaves white beneath, and large white flowers; *globosum* has white flowers in round heads; and *angustifolium* has leaves narrower than in the type.

Culture &c. as above.

L. palustre.—A native of marshy parts of the N. temperate zone. It grows into a dense compact bush, about 2 ft. high, and has linear leaves, with edges rolled back and rusty beneath. Flowers in April and May, white, or pinky-white, borne in clusters at the ends of the shoots, and somewhat resembling those of the Laurustinus (*Viburnum Tinus*). Stamens 10.

Culture &c. as above. There are several forms of this species, and they are somewhat confused with those of *L. latifolium.* One of the chief differences between the two species is that one has 5 stamens and the other 10, as stated above. The variety *decumbens* has very small narrow leaves, and a somewhat trailing habit; and *dilatatum* is a Japanese form with broader oblong oval leaves.

L. thymifolium.—A pretty little shrub about 2 ft. high, native of N. America. It has small, deep shining green leathery oblong obovate leaves about ¼ in. long, and produces heads of starry white flowers about ½ in. across in May, each blossom having protruding stamens tipped with purple anthers.

Culture &c. as above.

RHODODENDRON (Rose Bay).—A genus containing about 180 species of ornamental trees or shrubs, with alternate leaves often clustered at the ends of the branches, rarely sub-opposite or falsely whorled, entire, leathery. Flowers in clusters or corymbs at the ends of the branches, rarely solitary, or axillary; bracts broad, usually caducous. Calyx 5-lobed, cup-shaped or obsolete, leathery or foliaceous, persistent. Corolla often funnel-shaped, bell-shaped or cylindrical, rarely hypocrateriform or rotate, usually 5-lobed. Stamens 8–10, rarely 5, or 12–18. Ovary 5–20-celled; style long or short, bent down or incurved, with a knobby stigma. Capsule woody. Seeds numerous, minute.

There are few finer sights in the garden than a mass of Rhododendrons in bloom in early spring and summer, and it is a pity that many of the most beautiful kinds only find themselves perfectly at home in the southern and milder parts of the country.

In the favoured parts of Devonshire and Cornwall Rhododendrons assume luxuriant proportions, and begin to open their flowers several weeks before those in the Thames Valley and more northern places. The situations in which Rhododendrons are planted have a good deal to do with their ultimate success or failure. Speaking generally they should not be planted in positions where they will be exposed to the bleak northerly and easterly winds, nor yet to violent south-westerly gales. Leaving the stems fully exposed to the wind seems to do a good deal of mischief, although the soil may be warm and in the best condition. By planting in dells or on the sides of banks where the wind will pass over the heads of the bushes, there is a much better chance of growing Rhododendrons successfully. Every one has probably experienced the warmth and shelter of a tree trunk, a wall, or even a hedge, during a bitterly cold east wind. Rhododendrons and other plants, being living things, and influenced by heat and cold, are just as sensitive as animals and human beings to warmth and shelter. If these two points are attended to in planting, it will be fairly easy to grow Rhododendrons well, even in unfavourable parts of the kingdom, provided the soil and drainage are perfect.

Soil.—Rhododendrons not only thrive in good light sandy peat, but will also flourish in any good sandy loam and leaf soil. They dislike stiff dry clayey soils, and lime is fatal to them. To test the presence or absence of lime, take a fair sample and pour a little vinegar or sulphuric acid on it. If lime be present the soil will fizz, but not otherwise. Its presence or absence in a soil may also be discovered by breathing into water containing samples of soil in the way stated under Kalmia. A soil which is naturally chalky is quite unsuitable for Rhododendrons, and it is simply waste of time planting them in it, as the plants never flourish, although they may linger on for some years before finally giving up the struggle for existence.

Propagation.—Rhododendrons are increased in various ways. In favourable parts several of the hardiest kinds ripen their seeds, from which young plants develop every year. The choicer kinds may have the minute seeds carefully sown in pans of fine sandy peat (no soil covering being required) and kept in a shady part of the greenhouse or cold frame until the seedlings are well up, and fit to be pricked off into similar pans. Except in the mildest parts, however, it will hardly be safe to transfer seedlings—especially of the choicer kinds—to the open air until they are a few years old, and also strong and sturdy, as well as being thoroughly hardened off.

Where the plants are bushy and low-growing there is no difficulty in layering the shoots, and thus obtaining a good stock of healthy plants on their own roots. The plants very often layer themselves, and if left undisturbed will in the course of time assume large proportions. Layering being a natural process, it is more likely that plants obtained in this way will live longer than when grafted.

Cuttings of the partially ripened shoots may be inserted in sandy peat in summer, and kept close and shaded, but the majority often never root, and there is nothing gained by this method.

Grafting is extensively practised on stocks of *R. ponticum* raised from seed. Ripened scions are taken in autumn, and most of the leaves are retained. When attached to the stock by veneer or side grafting, they are kept in close shaded frames until union has taken place, when they gradually receive more air and light. Probably more from custom than anything else, *R. ponticum* has been used indiscriminately as a stock for almost all kinds of Rhododendron. But of late years a variety of the American *R. catawbiense* called *Cunningham's White* has been spoken of very favourably as a stock, and on the Continent at least it is extensively used for this purpose in some large nurseries. Coming from colder regions than the Asiatic *R. ponticum*, it is consequently hardier, and as a stock is not so likely to smother or outgrow the choicer kinds grafted on it, as is often the case with *R. ponticum.*

Mulching or *Top-dressing.*—One often sees Rhododendrons which although grown in good soil still present an unhappy appearance, and rarely give an adequate supply of blossom to justify their existence. This state of affairs is frequently seen in what are termed 'neatly kept' gardens. The neatness consists in clearing away from beneath trees and shrubs of every kind the leaves which fall on the ground every season. It is natural for leaves to fall, and they serve a useful purpose in giving back food to the soil and keeping it warm in winter. In fact they form a natural mulching and top-dressing, and should never be cleared from under trees or shrubs unless in cases of absolute necessity. In the case of non-flowering Rhododendrons experience proves that if the soil in which they grow is mulched with old leaves, or even the short grass from the lawns, they will in the course of a year or two come into a more or less free-flowering state.

Below is given a selection of the best natural species for outdoor cultivation in the British Islands. All of them will flourish more or less in the mild southern parts of England and Ireland, but not in less favoured spots. It is not really the winter frosts that do so much injury to the ripened wood and well-protected buds, but the frosts of April and May, when the sap has begun to flow, and the buds have burst forth from their winter protecting scales. Having once started into growth nothing can save the juicy young growths from injury by late frosts, if fairly severe.

The hard smooth-leaved kinds appear to be less liable to injury than the woolly-leaved kinds. The latter probably retain moisture much longer than the others, and in the event of frost, of course, become more or less sheeted with ice.

It is impossible to lay down any hard and fast line as to hardiness, as the seasons play such a large part in the ripening or otherwise of the wood. Many of the kinds mentioned below are recorded as having passed uninjured through as much as 20° frost, and very often plants have suffered more in southern parts than in northern ones.

As a rule, any of the Himalayan Rhododendrons which grow in a wild state at an elevation of more than 9000 or 10,000 feet are more or less hardy in the British Islands. For huge cold conservatories, like the Temperate House at Kew Gardens, they are magnificent, and of course come into blossom much earlier than the plants grown out of doors.

R. albiflorum. — An erect Rocky Mountain species 2–3 ft. high, with elliptic lance-shaped deciduous leaves 1–1½ in. long. Flowers in July, creamy white, in drooping clusters. Corolla rotate bell-shaped; stamens 10.

Culture &c. as above.

R. Anthopogon.—A native of Central and N. Asia 1–1½ ft. high. Leaves oval, rusty beneath. Flowers in April and May, sulphur-yellow, in heads. Corolla salver-shaped, bearded within. Stamens 8.

Culture &c. as above.

R. arboreum. — A handsome Himalayan tree 15-20 ft. high, with large, leathery, lance-shaped acute leaves, beautiful shining green above, silvery or rusty beneath. Flowers from March to May, white, rose, or blood colour, in dense heads. Corolla bell-shaped. Stamens 10. There are several varieties differing chiefly in the paleness or intensity of colour of their blossoms.

Culture &c. as above.

R. Aucklandi.—A native of Sikkim 4–8 ft. high, with leathery, oblong elliptic acute leaves 4–10 in. long. Flowers in May, the largest in the genus, 3–5 in. across, pure white, tinged with pink; tube short, yellowish and rosy towards the base.

Culture &c. as above.

R. barbatum.—A showy Sikkim tree, 40–50 ft. high, with reddish bark and elliptic lance-shaped acute leaves 5–7 in. long, somewhat hairy and fringed when young; stalks fringed with black hairs. Flowers deep puce or blood-red, bell-shaped, in round heads 5–6 in. in diameter. Very hardy.

Culture &c. as above.

R. blandfordiæflorum.—A slender twiggy Himalayan shrub about 8 ft. high. Leaves leathery lance-shaped pointed, 2–3 in. long, rusty beneath. Flowers varying from green to orange-red, 5–10 in a head. Stamens 10.

Culture &c. as above. This is closely related to *R. cinnabarinum* and is probably only a variation of it.

R. brachycarpum.—A tall-growing Japanese species resembling *R. catawbiense* in appearance. Leaves bluntly oblong, with a rusty silky down on the under surface. The pale yellow or cream-coloured flowers, each 1½–2 in. across, are dotted with green at the base of the upper lobes of the corolla, and are borne in large clusters at the ends of the shoots in early summer.

Culture &c. as above.

R. californicum.—A Californian shrub 3–8 ft. high with obovate elliptic leathery leaves. Flowers in June, rosy-purple, broadly bell-shaped, the lobes spotted with yellow within. Stamens 10.

Culture &c. as above.

R. calophyllum.—A pretty Himalayan shrub about 3 ft. high. Leaves stiffish leathery, ovate oblong or elliptic, 3–5 in. long, dark glossy green above, glaucous beneath when young, rusty when old, scaly. Flowers in May, pure white, tubular bell-shaped. Stamens 18–20.

Culture &c. as above.

R. camelliæflorum.—A native of Sikkim, with somewhat drooping branches 2–6 ft. long. Leaves elliptic-lance-shaped, 2½–3 in. long. Flowers in April, pure white, tinged with rose, 1½ in. across, solitary or twin on short curved stalks.

Culture &c. as above.

R. campanulatum (*R. æruginosum*). A beautiful Sikkim plant about 4 ft. high. Leaves elliptic mucronate, blunt or heart-shaped at the base, rich brown beneath. Flowers in April, bell-shaped, about 2 in. across, pale lilac with a few purple or rose spots. There are a few varieties, some with almost pure white flowers.

Culture &c. as above.

R. Campbelliæ.—A Sikkim tree 20–30 ft. high, with large lance-shaped leathery leaves, lobed at the base, and rusty beneath. Flowers in March and April, crimson-spotted, bell-shaped, in dense clusters.

Culture &c. as above.

R. campylocarpum.—A twiggy, branched shrub about 6 ft. high, native of Sikkim. Leaves leathery, 2–3½ in. long, oblong elliptic, lobed at the base, pointed at the apex. Flowers in June, sulphur-yellow, spotless, bell-shaped, about 2 in. across, 6–8 in a head.

Culture &c. as above.

R. catawbiense.—A native of the mountains of the S. United States, 3–6 ft. high. Leaves oval or oblong, smooth, 3–5 in. long. Flowers in July, lilac-purple, broadly bell-shaped, on rusty stalks.

Culture &c. as above. This species has been extensively used in producing the numerous fine hybrids now in existence. Perhaps one of the best forms of it is the well-known *Cunningham's White.* It is very hardy and is much used as a covert plant. As a stock for grafting it is considered superior to *R. ponticum.*

R. caucasicum.—A pretty spreading or decumbent Caucasian species about 1 ft. high. Leaves lance-shaped, ovate or obovate, rusty beneath. Flowers in August, rosy outside, white within, spotted with green, more or less bell-shaped. There are varieties with white, rose, and pale yellow flowers.

Culture &c. as above.

R. chrysanthum.—A dwarf Siberian shrub, with linear lance-shaped leaves, rusty beneath, and narrowed into a long stalk. Flowers in summer, golden-yellow, about 1 in. across, broadly bell-shaped, in terminal clusters.

Culture &c. as above. To keep this plant in good condition it should always have a good layer of Sphagnum Moss around the stems and covering the soil.

R. ciliatum.—A hairy Sikkim shrub about 2 ft. high. Leaves elliptic, pointed, leathery, 2–3 in. long, more or less hairy above, smooth and somewhat rusty beneath. Flowers in May, pale reddish-purple, about 1½ in. across. The variety *roseo-album* has larger flowers than the type, white, tinged with rose.

Culture &c. as above.

R. cinnabarinum.—A pretty Sikkim species, 2–3 ft. high. Leaves ovate or oblong lance-shaped acute, 2–3 in. long, rusty beneath. Flowers in April and May, brownish-red, with a long tube, rather small, nodding, 4–8 in a cluster. Stamens 10.

Culture &c. as above.

R. collettianum.—A pretty rusty-stemmed species, native of Afghanistan, where it is said to grow 8–10 ft. high. Leaves leathery, elliptic-oblong or lance-shaped, 2–3 in. long. Flowers in May, white, funnel-shaped, about 1 in. across, in dense heads. Stamens 10.

Culture &c. as above. This species in a small state is useful for planting in the rock garden in sheltered spots.

R. Dalhousiæ.—A straggling red-stemmed shrub 6–8 ft. high, native of Sikkim, where it grows on the trunks of trees. Leaves elliptic obovate, 4–5 in. long, with downy stalks ½ in. long. Flowers from April to July, white, tinged with rose, bell-shaped, lemon-scented, 3–4 in. across. Stamens 10.

Culture &c. as above.

R. dauricum.—A native of Siberia about 3 ft. high. Leaves deciduous, oval oblong, smooth, scaly. Flowers from January to March, rosy, rotate-bell-shaped, solitary or in twos or threes. The variety *sempervirens* has deep green, persistent leaves, and deep purple flowers.

Culture &c. as above. This is a very valuable little shrub owing to the early period at which it produces its blossoms. Although perhaps not so free as *R. nobleanum* or *R. præcox* it seems to be much hardier. Blooming so early in the year the plants should be grown in warm and sheltered nooks so that the blossoms shall suffer as little as possible from cold winds and frosts. *R. Keiskei* from Japan is closely related to this species but is dwarfer in growth. It has ovate leaves about 3 in. long, and rosy-purple flowers about 1 in. across, borne in loose clusters at the ends of the shoots.

R. Edgeworthi.—A native of Sikkim, 2–3 ft. high, with somewhat straggling branches. Leaves ovate lance-shaped acute, 2–4 in. long, upper surface wrinkled. Flowers in May and June, white, often tinged with blush or pale yellow, about 4 in. across, very fragrant. Stamens 10. Many beautiful greenhouse varieties have been raised from this species.

Culture &c. as above.

R. Falconeri.—A magnificent Sikkim tree about 30 ft. high. Leaves very leathery, oblong elliptic, glossy green above, densely covered with a rusty down beneath, 8–12 in. long, 5–7 broad. Flowers in May, white, numerous, in dense rounded heads. Corolla rather small, 10-lobed.

The variety *eximium* has purple flowers and may be a hybrid between *R. Falconeri* and *R. niveum*, as it has the characters of both.

Culture &c. as above.

R. ferrugineum (*Alpine Rose*).—A native of the Alps about 1 ft. high. Leaves oblong, like those of the Box tree, rusty beneath, slightly hairy when young. Flowers from May to July, scarlet or rosy-red, in umbels, funnel-shaped, with grey or yellow dots. The variety *albiflorum* has white flowers. The variety *myrtifolium* is a native of the Transylvanian Mountains and has rosy-red flowers rather larger than those of the type.

Culture &c. as above. *R. ferrugineum* and its varieties are very handsome and as a rule free-flowering, but some are more so than others. Besides their value as open air plants they are also amenable to gentle forcing in spring. The plants may be carefully lifted from the open ground in January and potted up. They may then be placed in a cool greenhouse where the temperature does not exceed 50°–55° F., and with a daily sprinkling of tepid water will be easily brought into blossom by the middle of April. After flowering they may be again transferred to the open ground, but it is not advisable to lift the same plants for forcing two years in succession, as the strain would probably be too exhausting and kill the plants.

R. formosum (*R. Gibsoni*).—A pretty shrub 3–8 ft. high, native of the Eastern Himalayas. Leaves bluntly lance-shaped, shining green above, scaly beneath. Flowers in April, white tinged with purple and yellow, large, somewhat bell-shaped, with an angular tube.

Culture &c. as above. This is rather tender, but succeeds in the mildest parts of the kingdom in the open air. It is a splendid greenhouse plant.

R. Fortunei. — A handsome Chinese shrub about 12 ft. high. Leaves more or less linear oblong acute, 5–7 in. long, glaucous beneath, with red-brown stalks. Flowers in May, pale rose, fragrant, shortly bell-shaped, 3–6 in. across, with 7 rounded lobes (instead of the usual 5), 8–10 blooms in a loose cluster; stamens 14.

Culture &c. as above. This species has been successfully crossed with *Aucklandi* and *Thomsoni*, and with the latter species has produced that remarkably fine hybrid known as *R. Luscombei*, which produces its loose masses of deep rosy-pink flowers so freely out of doors in April and May. One of the most interesting features of *R. Fortunei* is its fragrance, and now that several garden forms such as *Mrs. Thiselton Dyer* have been raised from it, there is a chance of obtaining a sweet-scented strain of hardy hybrid Rhododendrons which are sure to be highly appreciated.

R. fulgens.—A native of the Eastern Himalayas 4–6 ft. high. Leaves broadly obovate or oval elliptic, 4 in. long, glossy above, densely woolly beneath. Flowers in April and May, bright shining blood-red, bell-shaped, in dense heads.

Culture &c. as above.

R. glaucum. — A pretty shrub about 2 ft. high, native of Sikkim. Leaves crowded at the tips of the branches, 1–3 in. long, oblong or broadly lance-shaped, glaucous or whitish beneath, dotted with scales. Flowers in May, pale pinkish-purple, about 1 in. across, bell-shaped. Stamens 10.

Culture &c. as above.

R. grande (*R. argenteum*). — A fine Sikkim tree about 30 ft. high. Leaves obovate oblong acute, 6–12 in. long, 3–5 in. broad, green above, silvery-white beneath. Flowers in May, white, 2–3 in. across. Stamens 10.

Culture &c. as above. In S. Wales this species has passed safely through 28° frost, but the bloom buds often suffer owing to their earliness.

R. hirsutum (*Alpine Rose*).—A native of S. Europe 1–2 ft. high, near to *R. ferrugineum.* Leaves somewhat elliptic, hairy-edged. Flowers from May to July, pale red or scarlet, in umbellate corymbs.

Culture &c. as above. See *R. ferrugineum.*

R. Hodgsoni.—A tree 12–20 ft. high, native of the E. Himalayas. Leaves leathery oblong elliptic obovate or ovate lance-shaped, 1½ ft. long, silvery white, rarely rusty beneath. Flowers in May and June, pale purple or rose, broadly bell-shaped, over 2 in. across, 8-lobed, in heads 4–6 in. in diameter. Stamens 16–18, with dark purple-brown anthers.

Culture &c. as above.

R. Hookeri. — A native of Bhotan 12–14 ft. high. Leaves smooth, leathery, stiffish, bluntly oblong oval, 3–6 in. long, rather glaucous beneath. Flowers in April, red, bell-shaped, with 5 deeply cleft lobes. Stamens 10.

Culture &c. as above.

R. Jenkinsi.—A native of Bhotan 6–7 ft. high. Leaves oblong lance-shaped acute, 4–6 in. long, glaucous and densely scaly beneath. Flowers white, 4–6 in a corymb.

Culture &c. as above.

R. Kendricki. — A native of the Bhotan, 6–15 ft. high. Leaves 4–6 in. long, about 1 in. wide, clothed with reddish, clammy hairs when young. Flowers in March, bright scarlet, broadly bell-shaped, 5-lobed, 10–15 in a loose round head. Stamens 10. Tender.

Culture &c. as above.

R. Keysi. — A shrub 2–6 ft. high, native of Bhotan. Leaves ovate lance-shaped acute, smooth, glaucous and scaly beneath, 2–3 in. long. Flowers in July, red and yellow, tubular or urn-shaped, drooping, 5–6 in a corymb. Stamens 10, protruding.

Culture &c. as above.

R. lacteum.—A beautiful Chinese species with leaves resembling those of *R. Falconeri* in shape, but larger in size, and covered with a soft felt which is milky-white on the young leaves and pale red-brown on the older ones. The white flowers are about the same size as those of *R. Falconeri*, but they have not yet been produced in cultivation.

Culture &c. as above. This species is regarded as rather tender, but Mr. Bean of Kew records a fine plant growing in the open air in Mr. Acton's garden at Kilmacurragh, co. Wicklow. It is therefore likely to prove hardy at least in the mildest parts of the kingdom.

R. lanatum.—A native of Sikkim 10–15 ft. high or more. Leaves bluntly obovate or elliptic, 3–5 in. long, with a white or tawny wool beneath. Flowers in June, yellowish-white or pale primrose-yellow, broadly bell-shaped, dotted with red within, 2-2½ in. across.

Culture &c. as above.

R. lepidotum.—A Sikkim species 2 4 ft. high. Leaves obovate lance-shaped or oblong. Flowers in May and June, yellow or purple, 1 in. across, scaly outside, upper lobes spotted with green. Anthers large rich red-brown. There are a couple of varieties.

Culture &c. as above.

R. Maddeni. — A fine shrub 6–8 ft. high, native of Sikkim. Leaves elliptic lance-shaped more or less pointed, 4–7 in. long, tapering to short rusty stalks, often drooping, white or rusty beneath. Flowers in June and July, pure white, like those of the Madonna Lily, with a faint blush on the upper lobe, 3–4 in. across, funnel-shaped. Stamens 18–20.

Culture &c. as above.

R. maximum (*Great American Laurel*).—A N. American tree 6–20 ft. high. Leaves elliptic-oblong or lance-shaped, 4–10 in. long, very thick and smooth. Flowers in July, pale rose or nearly white, 1 in. across, bell-shaped, spotted with yellow and red, on clammy stalks.

Culture &c. as above.

R. Metternichi.—A Japanese shrub with leathery oblong or obovate oblong leaves, rusty beneath. Flowers in March, rosy, rather bell-shaped, in corymbose heads.

Culture &c. as above.

R. niveum.—A large Sikkim shrub with obovate lance-shaped leaves, woolly white all over when young, but only beneath when old. Flowers in May, bell-shaped, yellowish outside, lilac within, blotched with deeper lilac, and having 5 deep blood-red spots at the base. Stamens 10. The variety *fulvum* has deep purple flowers in large trusses, and leaves buff-coloured beneath.

Culture &c. as above.

R. Nuttalli.—A beautiful tree 12–30 ft. high, native of Bhotan. Leaves large, leathery, oval, 6–9 in. long, with dark brown scales beneath. Flowers in May, white or blush, fragrant, rather bell-shaped, 3–4 in. across, 4–6 in a head. Stamens 10. Corolla 5-lobed.

Culture &c. as above.

R. parvifolium.—A Chinese shrub with erect flexuose stems and oblong acute leaves ½–¾ in. long, scaly on both sides, green above, rusty beneath. The pale rosy, somewhat bell-shaped flowers appear in April and May in compact clusters at the ends of the shoots and have projecting stamens which are hairy at the base.

Culture &c. as above.

R. ponticum.—A native of Asia Minor 6–12 ft. high, or more. Leaves oblong lance-shaped, smooth, pale or slightly rusty beneath. Flowers in May, purple, often spotted on the upper lobe, about 2 in. across, bell-shaped rotate. There is a variegated form called *albo-marginatum*, in which the leaves are irregularly bordered with silvery or creamy white. The young growths look attractive, but the old leaves often show a withered appearance that is not handsome. It is not so hardy as the green-leaved type.

Culture &c. as above. This is the most common species in gardens, and it has many varieties with white, scarlet, pink, and purple-violet flowers variously spotted with yellow, green, or brown. There are also double-flowered forms. The single-flowered varieties are largely used as a stock upon which the choicer varieties are grafted. Satisfactory results are not always obtained by their indiscriminate use, and the variety known as *Cunningham's White* (see *R. catawbiense*) is now regarded with great favour as a better stock by many growers.

R. Przewalski.—A newly introduced Chinese evergreen species with white bell-shaped flowers borne in corymbose racemes.
Culture &c. as above.

R. punctatum (*R. minus*).—A North American species 3–6 ft. high with smooth and more or less elliptic obovate leaves 2–3 in. or more long, the under surface of which is covered with resinous dots. The rosy flowers, spotted on the inner surface, appear in April and May and are borne in dense clusters at the ends of the shoots. *R. rubiginosum* from China very much resembles this species, but has much larger flowers.
Culture &c. as above.

R. racemosum. — A dwarf compact Chinese shrub, 6–12 in. or more high, with almost sessile elliptic, Box-like leaves, about 1 in. long, and terminal trusses of pinkish-white flowers about 1 in. across, produced in April at the ends of the shoots, and also a few in the axils of the upper leaves.
Culture &c. as above. This species may be gently forced in greenhouses in spring in the same way as *R. ferrugineum*.

R. Rhodora (*Rhodora canadensis*).—A deciduous N. American shrub, 2–4 ft. high, with oblong leaves, whitish downy beneath. Flowers in early spring, before the leaves appear, rosy-purple, rarely white, in umbel-like clusters.
Culture &c. as above.

R. Roylei.—A beautiful and distinct Himalayan shrub 7–10 ft. high, with oblong glaucous-green leaves 3–4 in. long, and somewhat rusty-coloured on the under surface. The drooping or nodding tubular bell-shaped flowers, each about 1½ in. across, appear in May, 3 or 4 in a truss, and have a peculiarly distinct and rich shade of purple-red, flushed with magenta, that at once attracts attention, especially if the flowers happen to be seen with the sun shining through them.
Culture &c. as above. This species can be regarded as hardy only in the mildest parts of England and Ireland, and the south-west of Scotland perhaps.

R. Smirnowi.—A handsome Caucasian shrub 3–6 ft. high, with oblong blunt leaves 3–5 in. long, whitish woolly and often rusty-coloured beneath. The flowers appear in April and May and are of a distinct brilliant crimson-purple colour.
Culture &c. as above. This is a very hardy species and is likely to succeed in northern localities.

R. Thomsoni.—A beautiful Sikkim tree 6–15 ft. high. Leaves usually broadly roundish-ovate, quite smooth, rather glaucous beneath, 2–3 in. long. Flowers in June, 6–8 in a corymb, deep shining blood-red, 5-lobed, the upper lobe spotted. Stamens 10. Very hardy.
Culture &c. as above.

R. Ungerni.—A Caucasian shrub 3–6 ft. high, with leathery oblong leaves 4–6 in. long and 2 in. or more broad, the under surface being of a pure snowy whiteness. The large flowers are white, but often tinted with rose outside; and the filaments of the stamens are bearded about the middle.
Culture &c. as above.

R. virgatum.—A Sikkim Rhododendron 1½–3 ft. high, with scaly young branches and oblong lance-shaped acute leaves. The soft rosy-pink flowers appear in April, and are borne in clusters in the axils of the upper leaves.
Culture &c. as above.

R. Windsori.—A small Bhotan shrub, with leathery obovate lance-shaped leaves 4–5 in. long, shining above, silvery white beneath, changing to pale brown. Flowers in March, deep crimson-scarlet, in crowded heads. Stamens 10.
Culture &c. as above.

R. yedoense.—A Japanese species with hairy lance-shaped leaves in spring, and smaller linear spoon-shaped deep green ones in autumn. The rosy-pink funnel-shaped flowers are produced in early summer, only 3 blossoms as a rule being in a cluster.
Culture &c. as above.

R. yunnanense. — An erect-growing Chinese shrub with dark shining green leaves 2–4 in. long, covered with bristly hairs above, and glaucous beneath. The white or pale lilac flowers, 2 in. across, spotted with blood-red near the base of the upper lobes of the corolla, appear in May, 4–6 in a cluster.
Culture &c. as above.

HYBRID RHODODENDRONS

There are at the present time a vast number of hybrid forms now in cultivation—about 800 of which have received distinct names—and they have mainly been developed by crossing such species as *catawbiense*, *maximum*, *caucasicum*, *arboreum*, and *ponticum*; and more recently such fine species as *Aucklandi*, *Hookeri*, and *Thomsoni* have been utilised and have produced, if anything, still finer hybrids. It is a remarkable fact that although many of the species are tender in all except the milder parts of the kingdom their progeny have as a rule much hardier constitutions and have stood the winter in localities where their parents have been killed or at least severely injured. The deductions to be drawn from these facts are that to secure a really hardy race of Rhododendrons the plants must be raised from seeds which ripen in the British Islands, and not from imported seeds. Once a plant can be induced to grow in our climate and to ripen good seed, there is every chance of its becoming eventually acclimatised if plants are raised year after year from home-saved seeds. This will be a much better plan than grafting the more or less tender kinds on stocks of hardier ones, as in severe winters all but the latter are often killed, and the work has to be done over again and the labour of several years is wasted.

The following are some of the finest hardy hybrids of which the true parentage is recorded. There is no doubt that many others equally fine will in the future also be raised by crossing these either with one another or with the more or less hardy species described above. In addition there are many other varieties mentioned below to which fancy names have been given.

R. Wilsoni is a hybrid between *R. ciliatum* and *R. glaucum*, and is intermediate between the two. Flowers over an inch long, soft rose.

As Rhododendrons look better in masses of the same colour, the following is a list of some of the best varieties, arranged according to colour. A long list of mere names would be worse than useless.

White or Blush-White, spotted or unspotted. — Alarm, Baroness Schröder, Conqueror, Duchess of Connaught, Duc de Brabant, Fair Helen, Florian, Gloriosum, Lady Grenville, Lady Godiva, Lady Olive Guinness, Lady Rolle, Leviathan, Manglesi, Minnie, Madame Carvalho, Mrs. George Hardy, Mrs. John Clutton, Mrs. Russell Sturgiss, Mrs. T. Agnew, Neige et Cerise, Princess Christian, Purity, Sappho, Snowball, Snowflake, Sultana, The Bride, The Queen, Blanche Superbe, Elegantissima, Multiflorum, Omniflorum, Prince Camille de Rohan, Queen of Dwarfs, Splendens, Zampa.

Pink and Rose. — Achievement, Adrian, Agamemnon, Alexander Adie, Alexander Dancer, Annie Dixwell, Archimedes, Blandyanum, Brayanum, Countess of Cadogan, Countess of Clancarty, Currieanum, Cynthia, Desdemona, Duke of Norfolk, Eclipse, Elegans, Fleur de Marie, Hannibal, Hogarth, John Spencer, Lady Armstrong, Lady Clermont, Lady Dorothy Nevill, Lady Easthope, Lady Falmouth, Lady Howe, Lady Tankerville, Lord John Russell, Mrs. H. Ingersoll, Mrs. J. Kelk, Mrs. W. Agnew, Paxtoni, Rosabel, Satanella, Scipio, Sir Arthur Guinness, Sir H. de Trafford, Stella, Sylph, Crown Prince, Warrior, Titian, Vivian Gray, Jacksoni, Mirabile, Præcox.

Crimson and Scarlet.—Altaclerense, Brilliant, Atrosanguineum, Bai Waterer, Barclayana, Captain Webb, Charles Dickens, Correggio, Cruentum, Decorator, Duchess of Bedford, Duke of Connaught, Duke of Portland, Earl of Shannon, F. Gomer Waterer, Frederick Waterer, Francis Dickson, H. W. Hunnewell, Ignescens, James Bateman, James McIntosh, John Walter, Joseph Whitworth, Lady Herbert, Lord Clyde, Meteor, Mozart, Mrs. Fitzgerald, Mrs. John Waterer, Mrs. Shuttleworth, Mrs. W. Bovill, Nobleanum, Prince Albert, Princess Louise, Robert Burns, Robert Marnock, R. S. Field, Sir Robert Peel, The Grand Arab, Vandyke, W. E. Gladstone. William Austin, William Cowper, Vesuvius.

Purple, Magenta, Claret. — Auguste van Geert, Baron Schröder, Caractacus, Faust, Genseric, Gretry, Lucy Neal, Mrs. Heneage, Negro, Nigrescens, Old Port, Omer Pacha, Prince Arthur, Princess of Wales, Stamfordiana, Vauban, Victoria, William Downing, Verschaffelti.

There are many other varieties with shades of colour intermediate between those mentioned.

R. altaclerense. — This beautiful hybrid with brilliant scarlet flowers first appeared in 1835, and had been raised from *R. catawbiense* and *R. ponticum* in Highclere Gardens, near Newbury.

R. Harrisi.—A fine hybrid raised at Singleton from *R. arboreum* and *R. Thomsoni* by Mr. Harris, formerly gardener to Lord Swansea. It forms a compact sturdy bush and has oblong ovate leaves about 6 in. long, deep green above, paler beneath, with interlacing veins as in *R. Thomsoni*. The deep rosy-crimson flowers, with a few dark spots on the upper segments of the corolla, are as large as those of *R. arboreum*, and have a distinctly lobed cup-like calyx about a quarter of an inch deep. The first flowers borne by this hybrid appeared in the autumn of 1897, but the normal flowering period is in early spring. This is the first recorded hybrid between *R. arboreum* and *R. Thomsoni*.

Culture &c. as above.

R. kewense.—A beautiful hardy hybrid between *R. Aucklandi* and *R. hookeri*. It was first raised at Kew in 1874, but the first flowers did not appear until 1888. It is a fine bushy plant with shining green leaves 6–10 in. long. The flowers which appear in April and May are 3–4 in. across, and are at first rich rose, but gradually become paler in colour; some forms are almost pure white.

Culture &c. as above. It is much hardier than either of its parents.

R. Luscombei.—This was raised in 1880 by Mr. Luscombe, and is the result of a cross between *R. Fortunei* and *R. Thomsoni*. In April the bushes are literally covered with the large clusters of fine bright rosy-pink bell-shaped blossoms which droop somewhat slightly but gracefully from the tips of the shoots.

Culture &c. as above.

R. Manglesi.—A magnificent hybrid obtained by crossing *R. Aucklandi* with a hybrid variety called *album elegans*. The flowers appear in April and May and are 3–4 in. across, white, with numerous reddish-purple spots on the upper segment of the corolla.

Culture &c. as above.

R. nobleanum.—This grand hybrid is the result of crossing the Himalayan *R. arboreum* with the Caucasian *R. caucasicum*. It makes a noble bush or small tree and produces its large clusters of bright crimson bell-shaped flowers in January and February. I have seen it looking bright and cheerful after fairly hard frosts and when the snow has been lying on the ground for days. Another fine hybrid called *R. pulcherrimum* has the same parentage as *R. nobleanum*.

Culture &c. as above.

R. præcox.—A charming hardy hybrid between *R. ciliatum* and *R. dauricum*. It makes a fine bushy plant about 3–4 ft. high, and has elliptic leaves 1½–2 in. long. The rosy-purple blossoms 1½–2 in. across are borne in great profusion from the end of February and during March. There is a fine deep coloured form called *rubrum*.

Culture &c. as above.

R. roseum odoratum.—The parentage of this hybrid is somewhat obscure, being recorded simply as a cross between a 'hardy white Azalea and a hardy scarlet Rhododendron.' It produced fairly large trusses of pale rosy sweet-scented flowers, which individually are not very large.

Culture &c. as above.

R. Shilsoni.—This brilliant hybrid was raised by Mr. Gill, gardener to Mr. H. Shilson of Tremough, Penrhyn, Cornwall, from *R. barbatum* and *R. Thomsoni*, and is intermediate between the two. It makes a fine bushy plant with oblong or ovate-heart-shaped leathery leaves, 3–4 in. long, deep green above, paler beneath. The brilliant crimson bell-shaped flowers are about 2 in. across, and are produced in rounded heads at the ends of the shoots in April.

Culture &c. as above. This fine hybrid flowers profusely in the large Rhododendron house at Kew in March. It seems to be the first recorded hybrid between *R. barbatum* and *R. Thomsoni*.

AZALEA.—Although botanists are pretty well agreed that Azaleas should be known as Rhododendrons, gardeners are of another opinion, and still retain both names as representing two genera. The chief differences between Azalea and Rhododendron are that Azaleas are mostly softly hairy shrubs, with deciduous or evergreen, very rarely leathery leaves; flowers expanding before the new leaves are developed, funnel- or bell-shaped, 4–5-lobed, sometimes 2-lipped. Stamens 5 or 10, protruding. These characters, however, are met with singly or severally in some Rhododendrons, so that botanically it is impossible to separate one genus from the other, taken on the whole, and the species described below may be as fitly called Rhododendrons as Azaleas. There are no Azaleas in the Himalayas.

Culture and Propagation. — Hardy Azaleas may be cultivated and propagated in exactly the same way as the Hardy Rhododendrons described on p. 585. They delight in a moist peaty soil and will flourish in sunny or partially shaded situations so long as they are not allowed to suffer from drought during the summer months. A light loamy soil will also suit them well, provided it is free from lime, and has a good quantity of leaf mould mixed with it. The most effective way to treat the plants is to grow them in bold masses in beds by themselves on the grass or in front of dense shrubberies from which they will obtain protection from cold winds. They are readily increased by layering, but when possible a stock should be raised from home-saved seeds, as such plants are likely to prove hardier than the others and may also develop new and attractive shades of colour.

A. arborescens.—A deciduous Pennsylvanian shrub 10–20 ft. high. Leaves rather bluntly obovate, smooth on both surfaces, glaucous beneath. Flowers in May, large, reddish, not clammy.

Culture &c. as above.

A. calendulacea.—A beautiful deciduous shrub 2–6 ft. high, found wild from Carolina to Pennsylvania. Leaves oblong, downy or hairy on both surfaces. Flowers in May, yellow, red, orange, with a hairy tube. There are many garden varieties and hybrids which have emanated from this species.

Culture &c. as above.

A. dilatata.—A deciduous Japanese shrub closely related to *A. rhombica*, and producing its long-stalked bright rosy-purple flowers in May.

Culture &c. as above.

A. hispida.—A deciduous United States tree 10–15 ft. high, with hairy stems, and lance-shaped, glaucous leaves, hairy above, smooth beneath. Flowers in July, white, edged with red. Stamens 10.

Culture &c. as above.

A. indica (*Indian Azalea*).—A beautiful Chinese shrub 3–6 ft. or more high. Leaves oblong lance-shaped, hairy. Flowers bell-shaped, in ones, twos, or threes, purple, red, white &c.

Innumerable single and double varieties, in all shades of colour, have been produced from this species, and are chiefly grown in greenhouses, but many of the more vigorous varieties prove hardy in the mild southern parts of England and Ireland. Indeed in southern Cornwall they are quite hardy, and in such places they may be lifted in January and gently forced into early blossom in a cool greenhouse. *A. amœna*, a neat, compact Chinese shrub 1–3 ft. high, with a profusion of rich crimson flowers, is a distinct variety of *indica*, in conjunction with which it has produced many fine hybrids. *A. balsaminæflora* is a Japanese variety with beautiful salmon-red double flowers resembling those of a Balsam. *A. obtusa* has deep red flowers, and there is also a white-flowered form of it.

Culture &c. as above.

A. ledifolia (*A. liliiflora*). — A very hairy Chinese evergreen 2–6 ft. high, with elliptic lance-shaped leaves. Flowers in March, pure white, showy, bell-shaped, in threes at the ends of the branches. Calyx clammy.

Culture &c. as above.

A. linearifolia. — An interesting Japanese shrub, the yellowish branches of which, covered with stiffish hairs, are furnished with narrow Willow-like leaves and rosy-violet flowers.

Culture &c. as above.

A. nudiflora. — A North American shrub 3–4 ft. high. Leaves lance-shaped oblong, almost smooth, fringed on the edges; the midrib bristly beneath, woolly above. Flowers in April and May before the leaf buds fully burst in terminal clusters; not clammy.

Culture &c. as above.

A. occidentalis.—A Californian species, with elliptic green leaves and white flowers, the upper lobe having a yellow blotch at the base of the upper segment.

Culture &c. as above.

A. ovata.—A neat Chinese evergreen shrub with ovate leaves and dark rosy flowers.

Culture &c. as above.

A. pontica (*Rhododendron flavum*). A native of the Levant, Caucasus &c., 4–6 ft. high. Leaves shining green, ovate oblong, hairy ciliated. Flowers in

May, large, yellow or orange, tinged with red.

This must not be confused with *Rhododendron ponticum* (p. 590), a quite different plant.

Culture &c. as above. A very large number of garden forms have been developed from this species.

A. rhombica (*Rhododendron rhombicum*). — A much-branched Japanese shrub with rhomboid elliptic leaves 1–2 in. long, assuming a soft bronzy tint in autumn. The bright rosy flowers 1½–2 in. across appear in May and are usually borne in pairs.

Culture &c. as above.

A. Schlippenbachi.—A loose-growing deciduous shrub 3–5 ft. high, native of the wooded hills of Corea and Manchuria, and found also in Japan. The stoutish branches are furnished with obovate wavy leaves about 4 in. long, dark brown and hairy when young, but green and smooth when fully developed. The beautiful bright rosy flowers, shaded with lilac, and spotted with brown at the base of the corolla, are borne on hairy stalks, and appear in March and April, sometimes as many as 6 in a cluster in the axils of the upper leaves.

Culture &c. as above. This species is quite hardy in the Thames Valley, and small plants may be gently forced into early bloom in conservatories in spring.

A. speciosa.—A pretty N. American shrub 3–4 ft. high, with hairy branches, and lance-shaped, ciliated leaves, acute at both ends. Flowers in May, scarlet and orange, silky; calyx downy. There are numerous varieties.

Culture &c. as above.

A. Vaseyi. — A beautiful deciduous shrub, native of the mountains of North Carolina, where it reaches a height of 15 ft. or more. It has shining green lance-shaped pointed leaves 1½–3 in. long, with a few hairs on the upper surface and along the margins. The clear rosy-pink flowers, about 1½ in. across, with oblong petals, the 3 upper ones of which are spotted with reddish-brown, appear in April, while the leaves are still in the bud. The variety *album* has pure white flowers.

Culture &c. as above. This pretty flowering species ripens seed almost every year, and is quite hardy, at least in the Thames Valley. Young plants are easily raised from seeds and when only a few inches high begin to bloom. When 2–3 ft. high they make grand flowering bushes.

A. viscosa (*Swamp Honeysuckle*).—A North American shrub 2–4 ft. high. Leaves oblong ovate, acute, edges ciliate, midrib bristly beneath. Flowers in July, white, fragrant, in downy, clammy, and leafy clusters. The variety *nitida* has shining green leaves, with a bristly midrib, and white flowers tinged with red.

Culture &c. as above.

A. sinensis (*A. mollis*).—A beautiful Chinese and Japanese shrub, 3–4 ft. high. Leaves deciduous, elliptic, acutish, covered with a hairy down, greyish beneath. Flowers in May, orange-red or yellow, bell-shaped.

There are many double and single flowered varieties of this species, as well as numerous hybrids with other species, most of them used for forcing in conservatories in early spring. The flowers are now in a good many shades of colour and vary from white through pale yellow to orange, red, and pink. The foliage also is very handsome in autumn as it assumes various tints of colour, and where the plants are grouped in large masses or beds, the more or less brilliant hues of the foliage form an effective feature on the landscape in autumn. As *A. sinensis* itself is quite hardy at least as far north as the Midlands, many of its varieties would doubtless prove equally so in the open air. Seeds are ripened freely in favourable parts, and if sown as soon as ripe, or in spring in cold frames or greenhouses, in the same way as recommended for Rhododendrons at p. 585, young plants will be readily obtained. The more plants are raised in this way from home-saved seed the more likely are really hardy varieties to be obtained. The following is a list of some of the best known forms of *A. sinensis*; but it should be borne in mind that new names are constantly appearing in catalogues.

SINGLE-FLOWERED VARIETIES OF A. SINENSIS (*A. mollis*)

Alphonse Lavallé, orange, shaded scarlet; *Anthony Koster*, a splendid rich golden-yellow with large flowers; *Baron de Constante Rebecque*, shaded nankeen, blotched glossy orange; *Baron Edmund de Rothschild*, red, yellow spots; *Bouquet* *d'orange*, fine orange; *Chas. François Luppis*, rose, shaded magenta; *Chas. Kekulé*, orange-salmon, orange spots; *Chevalier de Reali*, straw-white; *Comte de Gomer*, lively rose, orange spots; *Comte Papadopoli*, rose, shaded orange; *Comte de Quincey*, bright yellow, spotted; *Consul Ceresole*, red, orange spots; *Consul Pecher*, rose, spotted dark orange; *Dr. Leon Vignes*, white, shaded nankeen; *Ebenezer Pyke*, salmon-red, orange spots; *Ernest Bache*, salmon, shaded orange; *Isabella Van Houtte*, nankeen, orange spots; *Mme. Caroline Lagrelle d'Hanis*, rose, stained salmon, orange spots; *Mons. Arthur de Warelles*, salmon, spotted orange; *Mrs. A. E. Endtz*, a glorified form of *Anthony Koster*, with equally large flowers but much deeper in colour and quite distinct; *W. E. Gumbleton*, bright nankeen. spotted olive.

DOUBLE-FLOWERED VARIETIES OF A. SINENSIS (*A. mollis*)

Aïda, pale rose, upper petals bright rose, blotched nankeen; *Apelles*, scarlet, shaded pale rose; *Ariadne*, white, shaded purple-rose; *Byron*, pure white, fringed; *Freya*, lilac-white, yellow centre; *Hora*, yellow, shaded rose, flaked carmine; *Il Tasso*, bright rose; *Le Titien*, yellowish-white, tipped pale rose, fringed; *Mécène*, white, edged lilac, yellow blotch; *Milton*, white, shaded rose; *Murillo*, rose-purple, shaded; *Norma*, flesh-colour, shaded rose, fringed; *Phébé*, nankeen-yellow, shaded red; *Phidias*, rose-white, shaded yellow, centre deep yellow, shaded purple; *Praxitèle*, white, shaded yellow; *Ribera*, white, shaded light rose; *Velasquez*, cream-white, bordered rose; *Virgile*, pale yellow.

Ghent, American, or Honeysuckle Azaleas.—This is a charming group first raised by the Ghent nurserymen, hence the name Ghent Azaleas. The species at first chiefly employed were American ones, *nudiflora*, *calendulacea*, and *occidentalis*, from which they were known as American Azaleas. They differ from the other Azaleas in being mostly small-flowered and often somewhat two-lipped like Honeysuckles (*Lonicera*), hence the third name. Whatever they have lost in size, however, they have gained in fragrance and hardiness, while they display a great range of colouring in their flowers.

Culture and Propagation.—These Azaleas require similar treatment to hardy Rhododendrons and other Azaleas. They flourish in moist peaty soil or well-drained light loam to which leaf mould has been added in abundance. They are excellent for growing in bold masses by themselves on the grass in places where they will receive shelter from cold winds by the surrounding vegetation. During May and June and even in the first half of July they constitute one of the finest and most attractive sights in the outdoor garden, owing to the great variation of their colouring and the freedom with which the trusses of blossom are produced during those months. Of late years hybridising has been extensively practised between this class of Azaleas and the varieties of *A. sinensis*, and thus a new race between Old and New World forms has been evolved.

The following is a list of the best varieties.

SINGLE-FLOWERED GHENT AZALEAS

Adolphe, deep rose-pink; *Adorée*, cream-white; *Alba-flavescens rosea*, white, sulphur and rose; *Amabilis*, orange-scarlet; *Amabilis tardiva*, rose; *Andromaque*, lilac; *Ardens grandiflora*, orange-scarlet; *Astreans*, orange; *Atro-sanguinea*, deep red; *Aurora de Royghem*, orange-red; *Bouquet de flore*, salmon-rose, striped white; *Bronze unique*, red, vermilion spots; *Calendulacea flammea*, flamed orange; *Calendulacea insignis*, golden orange; *Cardinal*, rose, shaded yellow; *Cardoniana*, rose, orange stripes *Charles Baumann*, cherry-red, shaded orange-crimson; *Coccinea grandiflora*, crimson; *Coccinea minor*, deep scarlet; *Coccinea speciosa*, dark carmine; *Cruenta*, deep orange-scarlet; *Cuprea aurantia*, salmon; *Cymodoce*, red, blotched flesh; *Decus hortorum*, salmon-red; *Delicata*, rose and carmine; *Dodoneus*, pink, striped white; *Duc de Provence*, vermilion, blotched with yellow; *Elegantissima*, flesh, striped rose; *Elizabeth*, yellow, shaded rose; *Emile*, rose-peach; *Esther*, pink and sulphur; *Eugenie*, blood-red; *Fama*, rose-lilac, yellow blotch; *Fanny*, nankeen, yellow blotch; *Flameola incarnata*, clear rose, shaded yellow; *Flamme de Punch*, salmon; *Flora*, pink, orange spots; *Florentina*, rose and salmon; *Formosa*, pink, shaded orange; *Fritz Quihon*, blood-red; *Fulva ochroleuca*, yellow, shaded rose; *Géant des Batailles*, dark carmine; *Globosa alba*, white; *Gloire de Verschaffelt*, sulphur, shaded pink; *Gloria mundi*, vermilion, spotted yellow; *Graf Alfred von Niepperg*, salmon-red, yellow blotch; *Grand Duc*, brick-red flamed orange; *Grandeur Triomphant*, deep orange; *Grand Monarque*, salmon-red, shaded orange; *Guillaume III.*, clear orange; *Honesta*, orange-scarlet; *Incarnata*, deep flesh; *Inflammata*, pink; *Jeanne d'Arc*, bright yellow; *John Weathers*, salmon-pink and orange; *Josephine Klinger*, scarlet, white spots; *Julda Schipp*, blood-red; *Jules César*, dark scarlet, spotted; *Julie Dupont*, brick-red; *Lactea carnea*, straw and red; *La Reine Elizabeth*, yellow, shaded rose; *La surprise*, vermilion, shaded orange; *Lucia*, flesh, shaded rose; *Madame Gustave Guilmot*, deep rose, yellow spots; *Madame Joseph Baumann*, salmon, striped white and orange; *Marianne*, pink, orange spots; *Marie Verschaffelt*, red, white shade; *Mathilde*, rose, with yellow blotches; *Melanie*, rose and yellow; *Meteor*, deep red and yellow; *Minerve*, rose-salmon, orange blotch; *Morterio Genio*, rose-red, shaded orange; *Nathalie*, fine rose; *Ne plus ultra*, orange-scarlet; *Nereide*, white, shaded pink and yellow; *Optima*, cream, edged salmon; *Oriflamme*, pale rose; *Pallas*, rose, shaded dark yellow; *Perelegans*, pink, striped rose; *Perle de printemps*, rose and yellow; *Præstantissima*, deep scarlet; *Prince Frederick*, orange-scarlet; *Prince Henri des Pays Bas*, blood-red; *Princess Adrienne*, blood-red, striped orange; *Princess Charlotte*, pale pink; *Princess Marianne*, rose-pink; *Rachel*, orange-red, yellow spots; *Recentissima*, buff, shaded scarlet; *Reine des Belges*, peach-red, spotted yellow; *Reine des Rouges*, deep red; *Remarquable*, orange-red, yellow blotch; *Rose d'Amour*, bright rose; *Rose d'Holland*, pale rose; *Rosea elegans*, pale rose, shaded cream; *Rosea grandissima*, rose-lilac, flushed white; *Rosea lineata*, rose-lilac; *Rosea sinensis*, orange-scarlet; *Saturne*, deep rose; *Souvenir de Morterii*, vermilion, yellow spots; *Speciosissima*, orange-scarlet; *Subtilissima*, straw and yellow; *Sully*, orange, shaded salmon; *Télémaque*, lilac; *Triumphalis*, straw and yellow; *Unique*, nankeen; *Venustissima*, deep orange; *Versicolor*, pink and cream; *Victor*, crimson; *Victoria tardiva*, pink; *Virginalis*, pure white; *Wilhelmina*, salmon-red, shaded orange; *Zelia*, cream, edged rose.

DOUBLE-FLOWERED GHENT AZALEAS.

Arethusa, cream-white, striped nankeen; *Bartholo Lazzaris*, flesh colour; *Bijou de Gendbrugge*, white and rose; *Chromatella*, yellow, shaded lemon; *Dr. Streiter*, rose-carmine, orange blotch; *Graf van Meran*, rose-white; *Heroine*, lilac-rose, shaded yellow and white; *Leibnitz plena*, orange, fine; *Louis A. van Houtte*, vermilion and orange; *Maja*, rose-lilac, shaded cream and yellow; *Mina van Houtte*, deep salmon-red; *Narcissiflora*, fine yellow; *Ophirie*, nankeen, shaded salmon-red; *Rosette*, rose-carmine, white shaded; *Van Houtte fl. pl.*, salmon-red, yellow spots.

MENZIESIA.—A genus containing 7 species of smooth or hairy bushes, with alternate stalked deciduous leaves, smooth or hairy beneath. Flowers in terminal corymbs or clusters nodding or drooping. Calyx 4–5-parted. Corolla cylindrical globose, urn- or bell-shaped, bluntly 4–5-lobed. Stamens 5, 8 or 10. Ovary 4–5-celled.

Culture and Propagation.—Menziesias thrive in moist peaty soil and are suitable for the rock garden or the flower border. They may be increased by seeds, layers, cuttings, or careful division as with *Bryanthus* (see p. 582).

M. glabella.—A native of the Rocky Mountains very much resembling *M. globularis*. The bluntly lance-shaped leaves are somewhat glaucous and nearly or quite smooth beneath, but with a few scattered hairs on the upper surface and on the margins. The lurid purple ovoid bell-shaped flowers appear in May in clusters at the ends of the shoots. The stamens are noticeable for having bearded filaments, and the seeds have appendages at each end.

Culture &c. as above.

M. globularis.—A N. American shrub 2–5 ft. high. Leaves ovate, clustered at the ends of the branches. Flowers in May, pink, drooping, roundish. The variety *M. ferruginea* is a much dwarfer plant with lance-shaped obovate leaves, tapering at each end, with rusty hairs above, paler beneath. Flowers in May, brown, oblong ovoid or cylindrical.

Culture &c. as above.

PYROLA (WINTER GREEN).—A genus containing about 14 species of smooth, stolon-bearing, stemless or caulescent perennials. Leaves radical or cauline, alternate, often long-stalked, persistent, entire or serrate. Flowers nodding, on erect racemose scapes. Calyx 5-parted. Petals 5, concave. Stamens 10, hypogynous, erect or bent down. Ovary 5-celled.

Culture and Propagation. — Pyrolas flourish in half-shady places in the rockery or border, in light moist sandy soil, with plenty of leaf mould or other vegetable matter. They may be increased by seeds sown as soon as ripe in the open border or cold frames, or in spring; or by dividing the plants in early autumn or spring.

P. elliptica. — A rather rare North American species about 6 in. high. Leaves leathery wedge-shaped oblong, remotely toothed or entire. Flowers in June and July, white, bell-shaped, in long one-sided racemes.

Culture &c. as above.

P. rotundifolia.—A British plant about 6 in. high. Leaves roundish, entire or slightly crenulate, with dilated stalks. Flowers from July to September, pure white, ½ in. across, fragrant, 10–20, nodding on an erect scape. The variety *arenaria* has smaller leaves than the type, and several scaly bracts below the flowers.

Culture &c. as above.

P. secunda. — A rare native of the British Islands and the N. temperate zone, with straggling stems 1–4 in. long. Leaves ovate acute serrate, 1–1½ in. long. Flowers in July, greenish-white, ¼ in. across, horizontal, on one-sided slender scapes 2–5 in. long.

Culture &c. as above.

Other British species are *media* with white flowers; *minor* having white flowers tinged with rose; and *uniflora* (or *Moneses grandiflora*) also with white blossoms.

CHIMAPHILA. — A genus with 4 species of very smooth stolon-bearing perennial herbs. Leaves stalked, somewhat whorled or distant, fleshy, persistent, shining, serrate. Flowers in terminal corymbs, rarely solitary, fragrant. Calyx 5-lobed or parted. Petals 5, roundish, concave, spreading or reflexed. Stamens 10, dilated and hairy at the middle. Ovary roundish 5-celled.

C. corymbosa (*Pyrola umbellata*). —A native of the N. Hemisphere 3–6 in. high. Leaves cuneate lance-shaped, serrate, 4–5 in a whorl. Flowers in June, greenish-white, tinged with red.

Culture and Propagation. — This is practically the same as for *Pyrola* described above. The Chimaphilas are suitable for damp, half-shady parts of the border or rock garden, and will flourish in ordinary good sandy soil, to which leaf-mould or peat has been freely added. The plants may be increased in early autumn or spring by dividing the roots; or seeds may be sown when ripe or in spring in sheltered parts in the open border or in cold frames.

C. maculata (*Pyrola*).—A rather procumbent N. American species, with lance-shaped acute leathery leaves opposite or 4 in a whorl, striped with white above, red beneath. Flowers in June, white, drooping, on downy stalks.

Culture &c. as above for *C. corymbosa.*

CLETHRA. — A genus containing about 25 species of downy or woolly trees and shrubs. Leaves sparse, persistent or rarely deciduous, stalked, entire, serrate or toothed. Flowers in racemes or panicles near the ends of the branches, rarely in corymbs or clusters. Calyx deeply 5- lobed or parted. Petals 5, obovate wedge-shaped, rounded at the apex, or 2-lobed, often erose. Stamens 10. Ovary round, 3-celled, 3-angled or lobed, downy or hairy. Capsule roundish, small, usually nodding.

Culture and Propagation.—Clethras flourish in the mild southern parts of England and Ireland, and enjoy a mixture of peat and sandy loam in moist places. They may be increased from seeds carefully sown when ripe, or in spring, on the surface of fine sandy peat soil, and covered with a sheet of glass; by layering the stems in autumn, or by inserting cuttings of the half-ripened shoots in sandy soil under a bell-glass in gentle heat, or a cold frame, shaded from the sun during the summer months.

If a practice were made of raising these plants from home-saved seed, it would probably have the effect of producing a much hardier race that would stand the winters in most of the milder parts of the kingdom.

C. acuminata.—A native of Carolina, 10–15 ft. high, with smooth, oval, pointed serrate leaves rather glaucous beneath. Flowers from July to October, white, fragrant, in spiked downy-white racemes.

Culture &c. as above.

C. alnifolia.—A native of the United States, 3-4 ft. high. Leaves smooth, wedge-shaped obovate acute, coarsely toothed, Alder-like. Flowers from July to September, white, in hoary racemes.

The variety *Michauxi* differs very little from the type; and the plants described below as *paniculata*, *scabra*, and *tomentosa* are also very similar, and are now regarded simply as varieties of *C. alnifolia.*

Culture &c. as above.

C. arborea.—A beautiful shrub, 8-10 ft. high, native of Madeira. Leaves oblong, tapering, lance-shaped, smooth, serrate. Flowers from August to October, white, in panicles. There is a dwarf variety, and one with variegated leaves.

Culture &c. as above. This is a rather tender plant, but grows well in the south, although it has been injured here and there by 10° frost. The variegated form is still more tender than the type, and must be grown in greenhouses in most parts of the kingdom.

C. canescens.—A pretty Chinese and Japanese shrub with elliptic acute leaves, 4-5 in. long, and serrate on the margins. The white Hawthorn-like blossoms appear in July and are borne in racemes 6-8 in. long.

Culture &c. as above.

C. paniculata.—A native of Carolina, 3-4 ft. high. Leaves smooth, narrowly cuneate lance-shaped pointed, serrate. Flowers from July to October, white, fragrant, in sub-terminal hoary panicles.

Culture &c. as above. See *C. alnifolia.*

C. scabra.—A native of Georgia, 3-4 ft. high. Leaves broadly wedge-shaped obovate acute, coarsely toothed. Flowers from July to October, white.

Culture &c. as above. See *C. alnifolia.*

C. tomentosa. — A Virginian shrub, 3-4 ft. high. Leaves wedge-shaped obovate acute, finely toothed towards the apex, whitish woolly beneath. Flowers from July to October, white, in hairy woolly racemes.

Culture &c. as above. See *C. alnifolia.*

LXVI. DIAPENSIACEÆ

An order containing only 6 genera and 6 or 8 species of small prostrate tufted bushes with sessile or long-stalked, narrow entire, or roundish toothed leaves. Flowers hermaphrodite, regular. Calyx 5-parted. Corolla hypogynous, funnel-shaped, bell-shaped, or salver-shaped, 5- lobed or parted; lobes leathery obovate or roundish, entire, erose, or lacerated. Stamens 5, epipetalous, free, or united in a ring round an equal number of staminodes. Ovary free, superior, roundish, 3-celled. Style thick, short or long, 3-lobed. Capsule leathery, erect.

PYXIDANTHERA.—A genus with only one species:—

P. barbulata (*Diapensia barbulata*). *Pine Barren Beauty.*—A peculiar tiny creeping evergreen about 2 in. high, native of New Jersey. Leaves imbricated, narrow, oblanceolate, entire, bearded at the base. Flowers in early summer, white or rose, solitary, sessile, numerous. Corolla shortly bell-shaped, Stamens 5, attached to the corolla.

Culture and Propagation.—This little plant flourishes in moist sandy soil in the rockery in sunny situations. It may be increased by careful division in spring, or seeds may be sown in cold frames when ripe, or in spring. The seedlings should be grown on until sturdy enough for the open air.

DIAPENSIA.—A genus consisting of 2 species of small smooth cushion-like or tufted herbs, with solitary, erect, stalked flowers at the ends of the branches. Calyx 2-3 bracteate, with broadly ovate obtuse sepals. Corolla salver-shaped or bell-shaped, with 5 spreading obtuse lobes. Stamens 5. Staminodes none.

D. lapponica.—A vigorous evergreen 1-2 in. high, native of the mountains of N. Europe and Arctic America. Leaves leathery, linear spoon-shaped, with somewhat reflexed edges. Flowers in July, pure white, solitary, thrown well above the cushions of green foliage.

Culture and Propagation. — This pretty little plant may be grown in exposed parts of the rockery in deep sandy peat with plenty of moisture during hot dry summers. It is increased by careful division in spring.

SHORTIA.—A genus containing 2 species of very smooth scapigerous herbs with a perennial stem. Leaves all radical, long-stalked, round or heart-shaped, toothed or serrate, persistent. Flowers in terminal scapes, solitary, large, nodding. Calyx 5-parted. Corolla bell-shaped, with 5 wavy crenate lobes. Stamens 5. Staminodes 5.

S. galacifolia. — A beautiful tufted plant 2–3 in. high, native of the mountains of N. Carolina. All the leaves are radical, or in other words, spring from the root. They are broadly elliptic or roundish with crenate edges and long stalks, and assume a beautiful purple-red tint on the approach of autumn and winter. The charming funnel-shaped flowers, about an inch across the mouth, appear in March and April, and are white in colour, shading off into pale rose with age. As a rule only one blossom is borne on a slender scape, but occasionally two are seen.

In recent years another species—*S. uniflora*—has been introduced from Japan, but it appears to differ little if at all from the North American plant. And it is possible that the same species grows wild in both the Old and the New World.

It may be as well to mention here that a plant which has been distributed within the last few years under the name of *Shortia californica* is really not a Shortia at all. It belongs to the Composite order, and is properly known as *Bæria coronaria*, which see, p. 524.

Culture and Propagation.—Shortias flourish in sandy peat or sandy loam in sunny situations better than in shady spots as often recommended, but they must not want for water during the summer months. They may be increased by imported seeds, or by carefully dividing well-established clumps in early autumn, with the runners.

SCHIZOCODON.—A genus with 1 or 2 species of smooth tufted herbs, having radical long-stalked ovate roundish leathery persistent leaves, heart-shaped at the base. Flowers few at the top of a scape, nodding. Calyx 5-parted; with linear oblong segments. Corolla bell-shaped, 5-lobed. Stamens 5, affixed to the tube of the corolla at the base. Staminodes linear, hairy above the stamens. Ovary ovoid roundish, 3-celled.

S. soldanelloides.—A beautiful tufted Japanese plant 2–3 in. high, with roundish sparsely toothed leaves having a somewhat wrinkled surface. Flowers in March, broadly funnel-shaped, deep rose, the edges deeply cut into spreading or recurved whitish thread-like fringe. The first plant to flower in cultivation was shown in London, March 28, 1893, by Capt. Torrens, Boston Manor, Hayes, Kent, the introducer, and had eleven flowers, drooping or horizontal at the top of the scape.

Culture and Propagation.—It seems to flourish in peat and sand, and will probably be at home in the rock garden if planted in warm sheltered positions. It is still very rare and little can be said about it, but when well established it may possibly be increased by carefully dividing the tufts in spring.

GALAX (Wand Plant).—This genus contains but one species :—

G. aphylla.—A charming little rock plant 3–6 in. high, native of N. America. Leaves all radical kidney-shaped or roundish heart-shaped, crenate-toothed with radiating veins, and slender stalks sheathing at the base. Flowers in July, white, small, numerous, at the top of a slender scape in a dense raceme. Calyx 5-parted. Corolla deeply 5-parted with obovate spoon-shaped entire segments. Stamens 5, united at the base of the corolla tube with an equal number of staminodes. Ovary ovoid 3-celled.

Culture and Propagation. — This species flourishes in moist peaty soil or leaf mould in cool damp or boggy places. It may be increased by seeds, or by careful division of established clumps in autumn or spring.

LXVII. PLUMBAGINEÆ—Thrift Order

A natural order with 8 genera and about 200 species of smooth or downy perennial herbs or rarely shrubs. Leaves sometimes clustered or in rosettes, simple, entire or with a short clasping stalk; or alternate on a branching stem with swollen joints. Stipules none. Flowers hermaphrodite regular. Calyx inferior, gamosepalous, tubular or funnel-shaped, 5-10- or 15-ribbed, the 5 primary ones often produced into teeth or lobes. Corolla gamopetalous, 5-lobed, hypogynous; lobes sometimes only cohering at the base. Stamens 5, opposite the petals or corolla-lobes. Ovary superior, sessile or with the corolla slightly stalked, 1-celled. Styles 5.

ACANTHOLIMON (PRICKLY THRIFT).—A genus containing according to some authors over 80 species of prickly bushes with tufted rigid linear somewhat triangled leaves, often sharply pointed or spiny, rarely short, blunt, and imbricate. Flowers on simple or forked scapes or peduncles. Calyx funnel-shaped, 10-ribbed, 5- toothed or lobed. Petals 5, united at the base with the stamens, or free, oblong or obovate.

Culture and Propagation. — These rather slow-growing plants flourish in sandy soil in sunny positions, and are more suitable for the rock garden than the flower border proper. They may be increased by seeds sown in cold frames, or on a warm shady border. They sprout rather slowly, but when large enough to handle may be transplanted. Large tufts may have the shoots layered in early autumn. Some fine sandy soil may be worked in carefully among the plants, the branches being slightly cut or torn, and covered, and afterwards well watered. By spring most of the shoots thus treated will be ready for severing from the parent plant. Cuttings may also be inserted in late summer, say August and September, in sandy soil in cold frames, where they may remain until spring or until well rooted.

A. acerosum.—This is a rare species, native of Asia Minor. It forms dense masses of stiffish glaucous sharp-pointed leaves. The rosy flowers, not quite so large as those of *A. glumaceum*, appear in July and August.
Culture &c. as above.

A. glumaceum (*Statice Ararati*).—A compact and fairly free-growing Armenian species about 6 in. high, with dense masses of sharply pointed leaves. Flowers in summer, rosy, about ½ in. across, 6-8 in a spikelet.
Culture &c. as above.

A. Kotschyi.—A rare and handsome species about 6 in. high, native of the East, with prickly leaves, and long spikes of white flowers produced well above the foliage during the summer months.
Culture &c. as above.

A. venustum.—A beautiful but rare alpine 6-8 in. high, native of Cilicia, with sharply pointed linear glaucous leaves. Flowers in summer, rosy, 12-20 on each arching spike.
Culture &c. as above.

STATICE (SEA LAVENDER). — A genus containing 100 or more species of perennial, rarely annual, herbs, bushes or shrubs, many of which are not hardy enough for our climate. Leaves in the stemless species radical and in rosettes; clustered in the tufted bushes; and somewhat scattered, alternate, entire, linear, spoon-shaped, or sinuately pinnatifid or dissected. Flowers often in branched racemes, corymbs, or panicles. Calyx often funnel-shaped and 10-ribbed, with 5 toothed or bristly lobes. Petals, with the stamens, united in a ring at the base, or free, oblong-obovate, heart-shaped, 2-cleft.

Culture and Propagation. — Statices flourish in ordinary garden soil which is fairly sandy. They are fine plants for the border or rockery, and when in bloom their hundreds of small close-set flowers have a charming effect. These are more or less dry and membranaceous and last a very long time after being cut, often well into winter when dried like 'Everlastings.'

The annual and biennial species may be raised from seed sown in spring in gentle heat, the seedlings being planted out in May or June. Seeds may also be sown when ripe in autumn in cold frames or greenhouses, and the seedlings grown on in pots under glass during the winter months. By May they will be fine and sturdy and fit for the outdoor garden, where they will flower sooner than plants raised from seed in spring. The perennial kinds may be increased in the same way, and by carefully dividing the tufts in spring or early autumn. During the summer months cuttings of the young shoots may also be inserted in sandy soil in a close frame or under a hand-glass; and some kinds like *S. latifolia*, for instance, can be readily increased by means of root-cuttings inserted in cold frames in September and October.

S. Bonduelli. — A graceful Algerian annual or biennial with rosettes of lyrate pinnatifid leaves, more or less downy or hairy and spreading over the surface of the soil. The beautiful golden-yellow flowers appear in summer on gracefully branched stems about 12–18 in. high.

Culture &c. as above. Increased by seeds sown in autumn or spring. This species likes a good sandy and well-drained soil, and open sunny situations, but can be regarded as hardy only in the mildest parts of the south and west.

S. echioides.—This Sea Lavender is a native of the Mediterranean shores and grows 6–9 in. high. It has tufts of small leathery obovate wedge-shaped leaves, green above and often reddish beneath. The bluish flowers are produced in much-branched graceful panicles from June to August or September.

Culture &c. as above. Increased by seeds sown in autumn or spring like *S. Bonduelli.*

S. elata.—A beautiful tufted stemless species, native of S. Russia, with blunt obovate wavy leaves. Flowers in July, blue, in dense masses on branched stalks about 2 ft. high.

Culture &c. as above. Increased by seed or division.

S. eximia. — A native of Turkestan, about 1 ft. high, with oblong spoon-shaped wavy leaves. Flowers in August, lilac-rose, in very dense branched heads.

Culture &c. as above. Increased by seed or division.

S. Gmelini. — A native of Eastern Europe 12–18 in. high with oval or obovat blunt deep green leaves, shortly stalked or almost sessile. Flowers from June to August, bluish, borne in large-branched clusters.

Culture &c. as above. Increased by seed or division.

S. latifolia.—This is perhaps the best of all Statices. Native of S. Russia, 1–2 ft. high. Leaves large, oblong elliptic, narrowed into stalks. Flowers in June, blue, on tall much-branched scapes. The variety *alba* with white flowers is a charming plant.

Culture &c. as above. This species is best increased by means of root-cuttings. The plants should be lifted certainly not later than the end of October, but before if possible, and the roots may be cut into pieces about 2 in. long, each one having an oblique cut at the lower end and a straight cut at the upper. The cuttings may be inserted perpendicularly in a cold frame, and almost every one will root and produce young plants by spring. The thinner roots may be placed lengthways and slightly covered with soil. They will also produce good plants. *S. latifolia*, too, may be increased by seeds, but the seedlings are apt to vary or deteriorate. Or the plants may be carefully divided about September.

S. Limonium.—This is a native plant and grows wild upon muddy shores. It has a stout woody creeping rootstock and long-stalked oblong or obovate lance-shaped leaves. The bluish-purple flowers appear from July to September, or later, and are borne on much-branched angular stems, 6–18 in. high. The variety *album* has white flowers.

Culture &c. as above. Increased by seed or division.

S. sinensis (*S. Fortunei*).—A smooth Chinese plant with acutely angled stems, about 1 ft. high. Leaves obovate lance-shaped, blunt. Flowers in April, yellow, on tall forked stalks.

Culture &c. as above. Increased by seed or division.

S. sinuata. — An elegant species, native of the Mediterranean region, with leaves pinnately cut into rounded lobes. The winged flower-stems are 1½–2 ft. high, and from July to September and October bear masses of blue flowers, varying from yellowish-white to clear yellow.

Culture &c. as above. Although a perennial it is best treated as a tender annual, see p. 78.

S. spathulata.—A native of Barbary, 1 ft. high, with blunt, spoon-shaped, glaucous, entire leaves. Flowers in August, purple, with a white calyx.

Culture &c. as above. Increased by seed or division.

S. speciosa. — A perennial species, native of S. Russia, with roundish or oblong oboval leaves of a blue-green hue, and rather abruptly narrowed at the apex. The white or rosy flowers appear from June to August, and are borne in dense clusters on stiffish flat or angular stems 12–18 in. high.

Culture &c. as above. Increased by seeds or division.

S. spicata.—An Asiatic annual about 6 in. high. Leaves in rosettes, oblong-lance-shaped, entire or cut, smooth or slightly hairy beneath. Flowers in summer, pink or white.

Culture &c. as above. Increased by seeds in autumn or spring.

S. Suworowi. — A beautiful annual about 1 ft. high, native of Turkestan. Leaves radical, oblong lance-shaped, entire, or coarsely lobed and toothed. Flowers in summer, soft lilac, in dense masses.

Culture &c. as above. Increased by seeds in autumn or spring.

S. tatarica.—A native of S.E. Europe, about 1 ft. high. Leaves tufted, 4–6 in. long, oblong spoon-shaped, wavy. Flowers in June and July to September, bright ruby-red. There is a narrow-leaved variety called *angustifolia* not often seen.

Culture &c. as above. Increased by seeds or division.

S. Thouini (*S. ægyptiaca*).—A tender rather glaucous annual about 1½ ft. high, native of S. Europe and N. Africa, with deeply cut and lobed leaves. Flowers in May and June, yellow, numerous, on forked scapes.

Culture &c. as above. Increased by seeds in autumn or spring.

ARMERIA (THRIFT; SEA PINK).—A genus containing about 20 species of tufted perennial grassy herbs with entire linear leaves, and flowers in dense solitary heads. Calyx funnel-shaped, 10-ribbed, and 5-toothed. Petals distinct or slightly united at the very base, obovate or oblong, entire. Stamens slightly adnate to the petals at the base.

Culture and Propagation.—Armerias flourish in well-drained sandy loam and leaf soil, and make excellent rock plants, or edgings for borders. Several kinds are easily increased by dividing the tufts in spring or early autumn, and well watering them into their new quarters. Seeds of the rarer kinds may be sown in cold frames in autumn, and the seedlings planted out in spring.

A. cæspitosa.—A pretty little Thrift, native of the Spanish mountains. It forms dense tufts of short narrow 3-sided rigid and recurved leaves, and during the summer months produces its small heads of pale lilac flowers on downy stalks 1–2 in. high.

Culture &c. as above.

A. dianthoides.—A native of S. Europe with slightly downy spreading leaves, and close heads of pale pink flowers in May and June, on stalks about 6 in. high.

Culture &c. as above.

A. juncea (*A. setacea*).—A native of S. France with small erect roundish, pointed, deep green leaves. Flowers in June, rosy-pink, in small heads on stalks about 3 in. high.

Culture &c. as above.

A. juniperifolia. — A densely tufted Spanish species about 6 in. high, with short stiff Juniper-like leaves. Flowers in May and June, deep rose, in small dense heads.

Culture &c. as above.

A. latifolia (*A. Cephalotes; A. formosa; A. mauritanica; A. pseudo-armeria*).—A handsome perennial 6–18 in. high, native of the Mediterranean regions. Leaves broadly lance-shaped, 3–4 in. long, smooth, acute, with channelled stalks. Flowers in June, deep rose or crimson, in large roundish heads or erect stalks.

Culture &c. as above. This species is rather difficult to divide successfully, and is on the whole best obtained by sowing seeds as soon as ripe in cold frames as recommended.

A. maritima (*Statice Armeria*). — A pretty tufted grass-like perennial 3–4 in. high. Flowers from May to July, pink or rose, in dense rounded heads on erect stalks. The variety *alba* has larger heads of pure white flowers, and is very handsome and quite as vigorous as the type; *alpina* is a dwarf alpine form; *laucheana* has a very dense habit and deep pink flowers on stalks about 6 in. high. *Crimson Gem* is a vigorous garden variety with heads of bright crimson flowers on stalks about 9 in. high; and *Ewart* is a very deep crimson-purple form that at once attracts attention.

Closely related to *A. maritima* is

the Greek plant *A. undulata*, but the outer leaves are linear lance-shaped and wavy on the margins, the inner leaves being linear and entire, while the flowers and bracts are white.

Culture &c. as above.

A. plantaginea (*A. leucantha; A. scorzoneræfolia*).—A pretty S. European species about 1 ft. high. Leaves grassy, broader than in *A. maritima*, 3–5-nerved. Flowers bright rose. There is an improved variety called *splendens*.

Culture &c. as above.

PLUMBAGO (Leadwort).—A genus containing about 10 species of perennial herbs, sometimes woody or rarely annual, some of which are not hardy. Leaves usually alternate, lobed and clasping, or dilated at the base into a clasping stalk. Flowers in spikes at the ends of the branches. Calyx tubular 5-cleft. Corolla salver-shaped, 5-lobed, with a slender tube. Stamens free from the corolla.

Culture and Propagation. — The hardy Plumbagos like a warm sandy loam or ordinary light garden soil and sunny positions. They may be increased by division, cuttings, or seed. *P. capensis*, a beautiful blue-flowered South African greenhouse climber, may be easily raised from seeds in autumn, and the seedlings will be ready for planting out in June; or cuttings may be rooted in summer and autumn, and wintered in a greenhouse until June. In the southern parts of the kingdom it may prove hardy in warm sheltered positions trained on a south wall. It certainly does very well in the open air during the summer months, and if protected with a piece of canvas or matting in winter, would probably prove hardy in favourable parts.

P. Larpentæ (*Ceratostigma plumbaginoides*). — A Chinese perennial with wiry stems about 1 ft. high, and obovate acute, finely toothed fringed leaves. Flowers in September, cobalt-blue or violet, in dense trusses, lasting until cut off by frost.

Culture &c. as above. It is easily increased in spring by dividing the tufts, or by planting portions of the rootstocks.

This species, if grown in masses, looks charming in the border or in raised beds. Plants here and there in the rockery are also effective. *P. europæa*, with violet-purple flowers, and *P. micrantha*, a Siberian annual with white flowers, are sometimes met with.

LXVIII. PRIMULACEÆ—Auricula and Primrose Order

An order containing about 250 species of perennial herbs, rarely annuals or shrubs. Leaves without stipules, sometimes all radical, sometimes cauline, alternate, opposite or whorled, simple, rarely lobed (much cut in *Hottonia*). Flowers hermaphrodite, usually regular, axillary or solitary, often in umbel-like or whorled racemes. Calyx free, very rarely attached to the ovary, 4–9-cleft, rarely deciduous. Corolla hypogynous, usually gamopetalous, rotate, salver-shaped, or funnel- or bell-shaped, 4–6-lobed. Stamens as many as the corolla lobes, attached to the corolla tube. Ovary free, ovoid or round, 1-celled. Style short or long, with a blunt or capitate stigma.

HOTTONIA (Water Violet; Feather Foil).—A genus with 2 species of water herbs, having submerged pectinately cut leaves. Flowers in racemes or whorls, dimorphic. Calyx 5-parted. Corolla salver-shaped, with 5 spreading lobes. Stamens 5, attached to the short corolla tube. Ovary superior, ovoid.

H. palustris.—A pretty British water plant, 1–2 ft. high, with leaves 1–2 in. long, deeply cut into linear segments. Flowers in May and June, ¾ in. across, lilac, with a yellow eye.

Culture and Propagation. — This species may be grown in the mud on the margins of ponds or streams. It is increased by division in spring, or by seeds.

PRIMULA (Primrose).—This genus now contains about 150 species of perennial herbs, with tufts of radical obovate spoon-shaped or roundish leaves, entire toothed or rarely lobed. Flowers in umbellate or whorled racemes, very rarely solitary. Calyx tubular, funnel- or bell-shaped, often inflated or angled, 5-lobed. Corolla hypogynous, funnel- or salver-shaped, with a short or long tube and 5 erect or spreading, entire, toothed, emarginate, or 2-cleft lobes. Stamens 5, attached to the corolla tube. Ovary superior, round or ovoid. Capsule splitting into 5 entire or bifid valves.

Primroses are found in the temperate parts of the world, about one-third being Himalayan, one-third Chinese and Japanese, and the other third spread through Europe, N. Asia and America, one or two on the mountains of Java, and one in the cold regions of S. America. With such a range of distribution, the natural conditions under which the various species grow differ considerably. Many of the exotic kinds will flourish under exactly similar conditions to those of our own beautiful Primrose, but others require different treatment. The conditions most suitable for each one will therefore be found after the description of each.

General Culture and Propagation.—Although the common Primrose and some of the other species may be increased easily enough by dividing the tufts, it is safer for the majority to be raised from seeds. These should be sown thinly in early autumn, or as soon as fully ripe, in shallow pans, in light sandy soil. They may be very slightly covered, and when the seedlings have become large enough to handle easily, they may be pricked off into similar pans to make more sturdy growth. In the case of choice or rare varieties it is safer to keep them in cold frames in pots plunged in ashes during the winter, keeping a strict watch for slugs. In spring they may be planted out, pot and all, in the spots most likely to suit them. They can then be taken up again in the event of severe winters and put in cold frames. Where certain kinds show a tendency to flower poorly after the first year, they should be treated as biennials. Primroses vary a good deal in size and habit, but they are all charming, and appeal to one's sense of the beautifully modest in the same way as the common form found in our copses, pastures, and hedge-banks. See also the remarks under *P. vulgaris* (p. 617), the *Auricula* (p. 618), and the *Polyanthus* (p. 620).

P. **admontensis** (*P. Churchilli*).—A natural hybrid between *P. Auricula* and *P. clusiana*, having spoon-shaped ovate, toothed, glandular, hairy leaves. Flowers in May, lilac, with heart-shaped corolla lobes. Calyx coloured, downy.

Culture &c. as above. Chalky soil in the rockery.

P. **algida.**—A pretty Siberian species with rosettes of oblong spoon-shaped, finely toothed leaves, about 2 in. long, with a broad tapering midrib. Flowers in spring, about ¾ in. across, bright crimson with a yellow eye, about 10–12 flowers on the top of a smooth scape 4–6 in. long. Petals deeply notched.

Culture &c. as above. Well-drained corners of the rockery in moist soil.

P. **Allioni.** — A very downy species, native of the mountains near Mentone. Leaves obovate or spoon-shaped, slightly and irregularly toothed. Flowers in April, about 1 in. across, mauve, with a white eye, solitary or in pairs.

Culture &c. as above. In sandy soil, in the rock garden.

P. **alpina** (*P. intermedia; P. rhætica*). A beautiful natural hybrid between *P. Auricula* and *P. viscosa.* Leaves broadly spoon-shaped or obovate, slightly toothed, with a floury appearance. Flowers in May, large, brilliant violet-purple, several on a flowery scape.

Culture &c. as above. Suitable for the rockery or flower border in sandy soil and leaf-mould.

P. **altaica.** — A native of the Altai Mountains, 3–5 in. high. Leaves spoon-shaped, or lance-shaped when young, sinuate-crenate, slightly mealy. Flowers in spring 1 in. or more across, mauve or purple-crimson, with a yellow centre, freely produced.

Culture &c. as above. A beautiful rock plant in well-drained soil.

P. **amethystina.**—A somewhat floury Chinese species, with ovate oblong Daisy-like leaves, having winged petioles. Flowers in June, reddish-purple, 3–6 in an umbel. Corolla lobes entire or notched.

Culture &c. as above. In loamy soil on banks or in the rockery.

P. **Arctotis.**—A pretty natural hybrid between *P. Auricula* and *P. viscosa.* Leaves broadly spoon-shaped obovate, blunt, toothed, green. Flowers in April, white or lilac-purple, densely glandular hairy.

Culture &c. as above. The rock garden in deep, sandy loam.

P. Auricula (*P. lutea*). — *Common Auricula.*—The wild Auricula is a pretty native of the Swiss Alps, about 3 in. high. Leaves oblong lance-shaped, or obovate, fleshy, glaucous or floury, somewhat toothed. Flowers in April, yellow, 1 in. or more across, many in an umbel. *P. Balbisi* is a pretty form with yellow flowers, and rounder glossy green leaves. *Dolomitis*, a Tyrolese variety, has lemon-yellow flowers 8–10 in an umbel, on green scapes 2–3 in. high.

Culture &c. as above. Borders or rockeries in moist rich sandy soil. The Garden Auricula and its forms are dealt with separately at p. 618.

P. auriculata (*P. longifolia; P. macrophylla*).—A handsome Austrian alpine, about 4 in. high. Leaves oblong or obovate, smooth, slightly crenate, pale but not floury beneath. Flowers in May and June, purple, with a white centre, 5–6 in a drooping umbel. Corolla tube 1–1½ in. long. There is a variety *glacialis*, and one from China called *polyphylla*.

Culture &c. as above. The rock garden, in free sandy soil and leaf mould.

P. bella. — A pretty little Chinese species, with long-stalked, ovate, or roundish deeply lobed leaves. Flowers in summer, violet-purple, large, 2–3 on a scape. Corolla lobes deeply notched; mouth of tube bearded with white hairs.

Culture &c. as above. Sheltered corners of the rockery in sandy soil and leaf mould.

P. bellunensis.—A native of the Alps of Belluno and probably a natural hybrid between *P. Auricula* and its variety *Balbisi*. Leaves broadly ovate, blunt, deeply and evenly toothed, densely fringed, with winged stalks. Flowers in May and June, large, golden-yellow, on long stalks.

Culture &c. as above. The rock garden in sandy loam and leaf mould.

P. Berninæ. — A natural hybrid or seedling variety from *P. viscosa* and its variety *hirsuta*. Leaves obovate or roundish, slightly crenate, glandular-hairy, clasping at the base. Flowers in April and May, large, rosy-purple.

Culture &c. as above. Rock garden in rich loam and leaf soil well-drained.

P. biflora.—A hybrid between *P. flörkeana* and *P. minima*, not more than 1 in. or so high, native of the Tyrol. Leaves about 1 in. long, rather wedge-shaped, serrate. Flowers in spring, large deep rose, in pairs on short stalks, numerous.

Culture &c. as above. A little gem for exposed sunny parts of the rockery in moist sandy loam and peat.

P. blattariformis.—A handsome somewhat hairy Chinese species, with ovate or obovate deeply crenate leaves. Flowers in spring, lilac, on scapes 8–12 in. high. Corolla lobes broadly obcordate.

Culture &c. as above. Sandy loam in the border or rockery.

P. bracteata.—A thick and woody-rooted Chinese species. Leaves wrinkled oblong blunt with long winged stalks. Flowers in March, large, yellow, with obcordate notched lobes. Calyx downy.

Culture &c. as above. Sheltered parts of the rockery with pieces of limestone or mortar rubble mixed with the soil.

P. bullata.—A beautiful thick-rooted Chinese species almost entirely covered with golden flour. Leaves lance-shaped, doubly serrate, with winged stalked flowers in April, golden-yellow, many on tall stalks.

Culture &c. as above. Requires same treatment as *P. bracteata*.

P. calliantha.—A pretty thick-rooted Chinese species. Leaves oblong or obovate oblong, leathery, covered with a golden powder beneath, finely crenate. Flowers in June, large, deep violet-purple, 5–10 in an umbel.

Culture &c. as above. Moist sandy loam and peat in sheltered parts of the rockery.

P. calycina.—A native of the Lombardy Alps. Leaves oblong or broadly lance-shaped entire, about 2 in. long, with cartilaginous margins, glossy green above, glaucous beneath. Flowers in May and June, about 1 in. across, purple in umbels, on stalks 2–4 in. high.

Culture &c. as above. Sandy soil in sheltered parts of the rockery.

P. capitata.—A beautiful Himalayan species with oblong wrinkled and toothed leaves, sometimes with a golden powder on the under surface. Flowers in autumn, deep violet-purple, in dense round heads 1½–2 in. across, covered with a white powder outside, on stalks 6–9 in. high.

Culture and Propagation.—This Himalayan species is apt to die out after one or two seasons in some gardens, and it is therefore advisable to raise it regularly from seeds, which are usually freely produced. It seems to thrive under opposite conditions according to locality. With some it flourishes in a moist soil with shade and shelter; and with others in situations fully exposed to the sun. Under the latter conditions it assumes richer tints of colour and seeds freely.

P. carniolica (*P. Freyeri; P. jellenkiana*).—A native of the Carinthian and Carniolan Alps with leaves in large loose rosettes, individually about 2 in. long, ovate lance-shaped, smooth, shining. Flowers in April and May, pale to deep blue, with a whitish centre, 8-10 on a stalk 3-4 in. high. The variety *multiceps* has larger and deeper blue flowers.

Culture &c. as above. The rock garden in free soil.

P. cernua.—A pretty Chinese species, with short broadly-ovate crenulate leaves. Flowers in July, deep purple-blue, several on top of the stalk.

Culture &c. as above. Requires chalky soil in sheltered spots in the rockery.

P. clusiana.—A pretty Tyrolese species 6-9 in. high. Leaves slightly downy, broadly ovate, obscurely toothed. Flowers in April and May, about 1 in. across, bright rose, in stalked umbels.

Culture &c. as above. Free loamy soil in the rockery or border.

P. cortusoides.—A distinct Siberian species 6-10 in. high. Leaves 2-4 in. long, soft, wrinkled, heart-shaped, rather lobed and toothed, on long stalks. Flowers in early summer, deep rose, over 1 in. across, on scapes about 6 in. long. There are many forms.

Culture &c. as above. Light rich, well-drained soil in sunny parts of the rockery or border suits this Primula very well. It is easily raised from seed.

P. cridalensis.—A beautiful natural hybrid from the Tyrol between *P. tyrolensis* and *P. wulfeniana.* Leaves roughish, broadly ovate, slightly fringed. Flowers in April and May, large, rosy-purple.

Culture &c. as above. Somewhat chalky soil in sunny exposed parts of the rockery.

P. daonensis (*P. œnensis*).—A little gem from the Tyrol and Swiss Alps. Leaves obovate serrate, glandular hairy on both sides. Flowers in May and June, very large, pale rose with a white centre.

Culture &c. as above. Moist sandy loam and leaf soil in exposed sunny parts of the rockery.

P. davurica.—A native of Dahuria and Siberia about 3 in. high. Leaves lanceolate spoon-shaped, almost entire, smooth. Flowers in May, salver-shaped, pink with a pale lemon centre, many in a head.

Culture &c. as above. Sandy soil with leaf mould in warm parts of the rockery.

P. Delavayi.—A distinct Chinese species with broadly ovate, roundish or heart-shaped leaves. Flowers in August, appearing before the leaves, large, deep purple, on stalks 1 ft. or more high.

Culture &c. as above. Damp clayey loam in the rockery or border.

P. denticulata.—A handsome vigorous Himalayan species 8-12 in. high. Leaves wrinkled, oblong lance-shaped, toothed, hairy, especially the under surface, which is also covered with a white powder. Flowers in spring and early summer, about ½ in. across, bright lilac, in dense round heads or umbels. The variety *pulcherrima* has large trusses of deeper lilac blossoms, and is an improvement on the type. *Henryi* is similar to *pulcherrima*, but more vigorous in growth. *Cashmeriana* is a lovely variety with oblong toothed leaves, pale green above, covered with golden powder beneath. Flowers from March to May, dark lilac or pale purple, in round heads on stout powdery stalks about 1 ft. high. The chief attraction of the variety *alba* consists in its trusses of white flowers. There is also a variegated form in which the leaves are edged with white.

Culture and Propagation.—These plants flourish in moist rich loamy well-manured soil either in the flower border or rockery in sunny situations, somewhat sheltered, as the leaves are apt to suffer by the spring frosts. Too much wet in winter causes the crowns to rot unless protected with sheets of glass or handlights.

P. dinyana.—A Bavarian natural hybrid between *P. integrifolia* and *P. viscosa.* Leaves 3-4 in. long, ovate lance-shaped, slightly toothed and fringed. Flowers in spring, deep purple, produced freely, 4-10 flowers in rather large heads on scapes 3–6 in. high. Corolla lobes narrowly obcordate.

Culture &c. as above. Deep rich soil in shady corners of the rockery.

P. discolor.—A pretty natural hybrid between *P. Auricula* and *P. daonensis*, native of the Tyrolese Alps, where it grows in the fissures of granite rocks at an elevation of 6000–7000 ft. Leaves ovate, toothed, slightly hairy. Flowers in April, large, lilac or violet-purple, with a white centre, on powdered stalks 3–4 in. high.

Culture &c. as above. Rich sandy loam in the border or rockery.

P. dryadifolia. — A tufted Chinese species with long slender rhizomes and ovate or somewhat heart-shaped leaves, having short winged stalks. Flowers in July, violet, 3–5 in an umbel. Calyx bell-shaped; bracts broadly ovate.

Culture &c. as above. Deep rich soil in the rock garden in sunny places.

P. Dumoulini.—A vigorous free-flowering hybrid between *P. minima* and *P. spectabilis*, native of the Austrian mountains. Leaves broadly wedge-shaped, shining green, toothed. Flowers in spring, deep rose, in dense heads on stalks about 2 in. high.

Culture &c. as above. Sandy well-drained peat in sunny parts of the rockery.

P. elatior (*Oxlip*). — A native of our British meadows and pastures and intermediate between the Common Primrose (*P. vulgaris*) and the Cowslip or Paigle (*P. officinalis*). Leaves obovate spoon-shaped, wrinkled, toothed, on winged stalks. Flowers in April and May, pale yellow, horizontal or drooping, 5–6 in an umbel. *Calycantha* is a pretty garden form with a large leafy frilled and lobed calyx coloured like the corolla.

Culture &c. as above. By shady woodland walks or banks in damp soil.

P. elliptica. — This species, 6–12 in. high, grows in Thibet and Cashmir at an elevation of 8000–12,000 ft. Leaves dark green and shiny above, about 2 in. long, ovate or oblong, sharply toothed, narrowed into a broad clasping stalk. Flowers in June and July, violet or bluish-purple, 4–12 in a loose umbel. Corolla lobes broad, deeply cleft.

Culture &c. as above. Rich moist sandy loam in the border or rockery.

P. elwesiana.—A beautiful Primrose from the Sikkim Himalayas, having stout fleshy rootstocks. Leaves entire, 2–3 in. long, somewhat spoon-shaped, acute, with broadly winged stalks. Flowers in early summer, deep purple, very large, solitary, on scapes 6–7 in. high, somewhat resembling those of a single-flowered Dianthus owing to the spreading and coarsely toothed corolla lobes.

Culture &c. as above. Sandy loam and leaf soil in the rockery in sheltered spots.

P. erosa.—A Himalayan species 4–8 in. high, near *P. denticulata.* Leaves oblong spoon-shaped, coarsely and unevenly toothed. Flowers in early spring, lavender or purple, powdery, in dense umbellate heads.

Culture &c. as above. This may be grown like *P. denticulata*, but not being so hardy requires more sheltered spots.

P. Escheri.—A hairy natural hybrid between *P. Auricula* and *P. integrifolia.* Leaves 1–2 in. long, ovate lance-shaped, serrate. Flowers in April, large, rosy or lilac-purple, several on a scape 2–3 in. high.

Culture &c. as above. Sandy loam and leaf soil in the rockery.

P. Facchini.—A pretty Tyrolese natural hybrid between *P. minima* and *P. spectabilis.* Leaves in compact, bright green rosettes, spoon-shaped, deeply crenate near the apex. Flowers in May and June, rather large, rosy-purple, 2–3 on a scape.

Culture &c. as above. Ordinary well-drained soil in sunny parts of the rockery.

P. farinosa (*Bird's Eye Primrose*). A beautiful British species 3–12 in. high. Leaves 1½–2 in. long, obovate-oblong or spoon-shaped, roundly toothed, smooth above, covered with a silvery or pale golden powder beneath. Flowers in June and July, about ½ in. across, pale purple or lilac with a yellow eye, in compact umbels. Corolla lobes wedge shaped, deeply notched. Calyx oblong-obovoid, mealy. The variety *acaulis* is a tiny plant with flowers nestling among the leaves, and looking very pretty.

Culture &c. as above. Moist deep well-drained sandy loam or peat in crevices of the rockery.

P. Fedtschenkoi.—A native of Turkestan 6–9 in. high. Leaves oblong spoon-shaped, slightly crenate. Flowers in summer, deep violet-purple, in a series of whorls at the top of the scape.

Culture &c. as above. Ordinary garden soil and leaf mould in the rockery or border.

P. floribunda.—A beautiful free-growing Himalayan species. Leaves stalked, elliptic lance-shaped, toothed, somewhat downy. Flowers in summer, bright golden-yellow, about ½ in. across, numerous, on erect stalks, 4–8 in. high. The variety *grandiflora* is simply a large-flowered form of the type.

Culture &c. as above. The rockery or border in ordinary soil. Requiring slight protection in winter. Easily raised from seed.

P. flörkeana (*P. minima hybrida*). A free-growing natural hybrid between *P. minima* and *P. viscosa*, native of the Swiss and Tyrolese Alps. Leaves rather broadly wedge-shaped, about 1 in. long, toothed. Flowers in spring, deep lilac or lilac-purple, several on a scape about 2 in. high. Corolla lobes heart-shaped, deeply notched. Involucre leafy.

Culture &c. as above. The rockery in moist well-drained sandy loam.

P. Forbesi. — A pretty free-flowering downy Chinese species with rosettes of broadly oval or oblong, unequally toothed leaves, 2–3 in. long, with slender stalks 2–3 in. long. Flowers in March and April and onwards, 4–6 in distant whorls on slender pedicels, the peduncles being 6–12 in. or more high. Single flowers ½–¾ in. across, soft rosy-purple, whitish and orange in the centre. Corolla lobes broad, deeply notched.

Culture &c. as above. This likes warm sheltered parts of the rockery or border in rich sandy loam and leaf soil. It is perhaps too tender to stand sharp winters, but may be readily raised from seeds sown in gentle heat in March.

P. Forsteri.—A robust natural hybrid between *P. minima* and *P. viscosa hirsuta*, native of the Tyrol. Leaves 2–4 in. long, rather roundly wedge-shaped, deeply and sharply toothed at the apex, hairy above. Flowers in early spring and again in autumn, deep rose, large, with a white throat, 2–3 on a scape.

Culture &c. as above. Sandy loam in the rockery.

P. gambeliana. — A native of the temperate Himalayas. Leaves roundish heart-shaped, toothed, smooth, about 1 in. across. Flowers about 1 in. across, purple, with round slightly notched corolla lobes.

Culture &c. as above. Sheltered nooks in the rockery, in rich sandy loam and leaf soil.

P. geranifolia.—A native of the Eastern Himalayas with short thick rootstocks. Leaves roundish and deeply heart-shaped, 1–1½ in. wide, hairy, pale green, with small lobes. Flowers in May, pale purple, ½ in. across, on softly hairy scapes 6–10 in. high.

Culture &c. as above. The border or rockery in rich gritty soil, in sunny sheltered spots.

P. glacialis. — A pretty little Chinese species with oblong obovate toothed leaves. Flowers in June, violet, 3–5 in an umbel. Calyx deeply cleft into long linear lobes.

Culture &c. as above. Crevices of rocks in sandy soil in sunny sheltered spots.

P. glutinosa.—A beautiful and distinct species about 4 in. high, native of the Austrian and Tyrolese mountains. Leaves lanceolate wedge-shaped, toothed towards the apex, deciduous in winter. Flowers in early summer, bright bluish-purple, in clusters. Corolla lobes deeply cleft.

Culture &c. as above. Rich moist sandy loam or peat in the rockery.

P. grandis.—A native of Central Asia, about 9 in. high, with large, rather oblong obovate toothed leaves. Flowers small, bright yellow, drooping in umbels at the top of long scapes. The corolla is deeply 5-lobed, but the oblanceolate lobes are in a line with the tube, and not spreading away from it.

Culture &c. as above. The border or rockery in warm spots in good sandy loam and leaf soil.

P. Heeri. — A dense tufted natural hybrid between *P. viscosa hirsuta* and *P. integrifolia.* Leaves ovate lance-shaped, 1–2 in. long, slightly toothed, hairy. Flowers in April, large, purple, several on a scape.

Culture &c. as above. Sandy loam and leaf soil in the rockery.

P. hirsuta.—An Alpine Primrose with rather woody stems, and rosettes of thickish broadly oblong spoon-shaped leaves, toothed on the margins, and clothed with downy glandular hairs. The flower-stems, 2–3 in. high, appear in April and May and are surmounted by an umbel of rosy-carmine or purple flowers.

Culture &c. as above. This species flourishes in well-drained sandy loam or peat, and may be grown in crevices or fissures in the rock garden.

P. Huguenini.—A tufted natural hybrid between *P. glutinosa* and *P. integrifolia.* Leaves in dense rosettes, 1 in. long, obovate or lance-shaped, toothed towards the apex. Flowers in April and May, large, deep purple, several on a scape 2–3 in. high.

Culture &c. as above. The rockery in sandy soil and leaf mould.

P. Huteri. — A pretty little Tyrolese hybrid, about 1 in. high, between *P. glutinosa* and *P. integrifolia.* Leaves long spoon-shaped, with 11–15 short broad teeth thickened at the tips. Flowers in May, deep violet, on clammy scapes.

Culture &c. as above. Crevices in the rock-garden in gritty soil.

P. imperialis (*Royal Cowslip*). — A distinct and attractive species, native of the Pangerango and Gedah mountains in Java, where it grows wild at an elevation of 9000 ft. The leaves are like those of *P. japonica* but larger, sometimes measuring 18 in. long by 5 in. wide. The stout erect scape (which sometimes reaches a height of 8 ft. in a wild state) springs from the centre of the rosette of oblong spoon-shaped coarsely toothed or crenate leaves, and is quite ½ in. in diameter at the base. The deep yellow or orange flowers, about ¾ in. across, are in whorls as in *P. japonica*, the lowest whorl being 18 in. from the base of the scape. As many as 12–20 flowers are in each whorl, the buds being erect, while the expanded blossoms are horizontal or drooping, and the calyx is covered with a white mealy powder.

Culture &c. as above. This species ripens seeds in cultivation, and although a native of a tropical country it is found at such an elevation that it is practically a temperate plant. Indeed Honeysuckles (p. 482), St. John's Wort (p. 265), and Guelder Roses (p. 480) are found on the same mountains at lower elevations, so that wherever these shrubs grow the 'Royal Cowslip,' as this Javan species has been called, will also grow equally well. By continually raising plants from home-saved seeds sown in cold frames as soon as ripe, it may be possible in the course of time to eliminate any tender qualities the species is likely to possess. As *P. prolifera* (p. 614) has been confused with this species in the 'Botanical Magazine,' t. 6732, it may be as well to say that the two plants are quite distinct, although both have yellow flowers. The true *P. imperialis* is figured in a later issue of the 'Botanical Magazine,' t. 7217, and also in the 'Garden' for September 19, 1891.

P. integrifolia (*P. candolleana*). — A pretty compact-growing species, 2–3 in. high, native of the Pyrenees and Switzerland. Leaves elliptic or oblong, entire, smooth, shining, edges fringed. Flowers in spring and early summer, rosy, 1–3 on scapes 2–3 in. high. Corolla lobes deeply cleft.

Culture &c. as above. Moist rich loam in the rockery.

P. intermedia. — A pretty Tyrolese hybrid between *P. clusiana* and *P. minima.* Flowers fragrant, purple-crimson, with a bright yellow eye, on stout erect scapes.

Culture &c. as above. Sheltered parts of the rockery in sandy soil.

P. involucrata. — A beautiful Himalayan species 5–7 in. high. Leaves erect, oblong lance-shaped, bright green, narrowed into a stalk. Flowers from March to May, creamy white, with a yellowish centre, in umbels. Corolla lobes roundish.

Culture &c. as above. This species flourishes in very moist or swampy places, and is sometimes grown in pots plunged half-way up in water. The variety *Munroi*, which requires similar treatment, is somewhat taller, with heart-shaped slightly toothed leaves on long stalks, and white flowers with a yellow centre, fragrant.

P. japonica (*Japanese Primrose*).—A splendid Japanese species 1–2 ft. high. Leaves 6–12 in. long, oblong spoon-shaped, tapering towards the base, coarsely and irregularly toothed. Flowers in May and June, about 1 in. across, deep or pale crimson, on scapes 1–2 ft. high, with 5–6 many-flowered whorls, lower ones opening first. There are several colour forms—

including a white one—but none is so good as the type.

Culture &c. as above. Grown in masses in deep rich loam, in moist and partially shaded spots, *P. japonica* is very effective, and lasts a long time in bloom. It is very free and vigorous in growth, and may be raised readily from seeds, although they are sometimes slow in germinating. This process, however, may be facilitated by steeping the seeds in warm water for a few hours previous to sowing.

P. kaufmanniana.—A pretty species 6-12 in. high, native of Turkestan. Leaves long-stalked, roundish, softly downy, with irregularly toothed basal lobes. Flowers in summer, glossy violet, 1 in. across, 10-18 in a whorl.

Culture &c. as above. Border or rockery, in well-drained sandy loam and leaf soil.

P. Kerneri.—A natural hybrid between *P. Auricula* and *P. viscosa.* Leaves broadly obovate, or spoon-shaped, toothed, bright green, covered with black hairs. Flowers in April and May, bright purple, with a yellowish centre, several on stout scapes 2–4 in. high.

Culture &c. as above. Sandy loam in the rockery.

P. khasmiriana. — A smooth, handsome Himalayan species about 6 in. high, related to *P. sibirica.* Leaves long-stalked, ovate, elliptic. Flowers in June, rosy-lilac, in stalked umbels.

Culture &c. as above.

P. kitaibeliana.—A charming Croatian species near *P. spectabilis*, with ovate pointed, serrate leaves, densely covered with short white hairs. Flowers in April and May, rosy-purple, freely produced.

Culture &c. as above. Rich loam and leaf soil in sunny parts of the rockery.

P. latifolia. — A handsome Pyrenean species 4-8 in. high, related to *P. viscosa.* Leaves broadly oblong or obovate, 3–4 in. long, sharply toothed towards the apex, hairy on both surfaces, and fringed. Flowers in early summer, about 1 in. across, violet, fragrant, with a powdery throat and calyx, 1–20 in an umbel.

Culture &c. as above. Moist sandy loam and leaf soil in the rockery.

P. lebliana. — A beautiful hybrid between *P. Auricula* and *P. wulfeniana.* Leaves in dense rosettes, ovate lance-shaped, 1–2 in. long, sharply toothed, smooth and shiny above. Flowers in April and May, rose-purple, 3–8 on a scape 3–4 in. high.

Culture &c. as above. Rich sandy loam and leaf soil in the rockery.

P. longiflora.—A species resembling *P. farinosa* in general appearance, native of grassy regions of the higher Alps. Leaves 1–2 in. long, ovate-oblong, pointed, irregularly notched or toothed, slightly covered with a whitish powder beneath. Flowers in May and June, over ½ in. across, bright violet or purple, powdery, several on stout scapes 1–1½ ft. high.

Culture &c. as above. Rich moist sandy loam in the border or rockery.

P. longobarda. — A distinct plant, native of the Tyrol, Lombardy &c. Leaves obovate lance-shaped acute. Flowers in April, rose-purple, about ¾ in. across, several on a scape.

Culture &c. as above. Chalky sandy soil in the rockery.

P. luteola. — A handsome Caucasian species 1½–2 ft. high. Leaves 6–12 in. long, oblong, toothed, and tapering towards the base. Flowers in summer, pale yellow, deeper in the centre, in round heads on scapes 1 ft. or more high.

Culture &c. as above. Rich moist loam and leaf soil in borders or the rockery, in exposed situations.

P. magiassonica.—A tufted Tyrolese hybrid between *P. spectabilis* and *P. minima.* Leaves about 1 in. long, ovate or obovate, smooth, slightly serrated. Flowers in May, rosy-purple, on short scapes.

Culture &c. as above. Sharp sandy soil in the rockery.

P. marginata.—An attractive species 2–4 in. high, native of the Swiss Alps, recognised by the whitish margins of its oblong or obovate, deeply and unequally toothed leaves. Flowers in April and May, violet-rose, or pale purple, about ¾ in. across, with a powdery throat; 6–9 on a scape. There are varieties known as *cærulea major*, *densiflora*, and *grandiflora.*

Culture &c. as above. Moist sandy loam in chinks in the rockery.

P. minima (*Fairy Primrose*).—A tiny species 1–2 in. high, native of the mountains of S. Europe. Leaves wedge-shaped, about ½ in. long, smooth and shining, toothed towards the apex. Flowers in early summer, rosy, or sometimes white, about 1 in. across, solitary, or occasionally in pairs.

Culture &c. as above. Chinks of the rockery, or in patches, in moist sandy loam. *P. minima* has a great tendency to cross-fertilise with other species growing near it, and as may be seen from the descriptions many hybrids owe their origin to its influence.

P. minutissima.—A tiny Himalayan gem with deep green rosettes of leaves ½–1 in. across, oblanceolate toothed, powdery beneath. Flowers in July, individually about ½ in. across, bright purple, 1–3 on scapes scarcely rising above the foliage. Corolla lobes cleft.

Culture &c. as above. To obtain the best effect, several plants should be grown closely together in free sandy loam and leaf soil in the rockery.

P. mistassinica (*P. pusilla*). — A N. American species about 3 in. high. Leaves spoon-shaped, toothed or crenate, smooth. Flowers in June, salver-shaped, red, 1–8 in a whorl. Corolla lobes obcordate, slightly notched.

Culture &c. as above. Well-drained soil in the rockery.

P. mollis.—A distinct Himalayan species with long-stalked, hairy, roundish, heart-shaped, bluntly toothed leaves, hairy on both surfaces, and 2–3 in. long and broad. Flowers from May to July, about 1 in. across, starry, crimson, with a deep crimson eye; 6–8 in whorls on the upper part of a stout scape 9–12 in. or more high. Corolla-lobes oblong obovate, notched.

Culture &c. as above. May receive the same treatment as *P. japonica*.

P. muretiana. —A hybrid between *P. integrifolia* and *P. latifolia*, and resembling *P. dinyana*. Leaves 3–4 in. long, broadly ovate lance-shaped, entire or slightly toothed, covered with clammy hairs. Flowers in April and May, deep rich purple, several in an umbel.

Culture &c. as above. Rich deep sandy loam and leaf soil in rather shaded parts of the rockery.

P. muscoides.—A small densely tufted native of the Sikkim Himalayas. Leaves obovate oblong or rather spoon-shaped, coarsely toothed. Flowers in early summer, purplish, small, solitary. Corolla lobes deeply cleft. The variety *tenuiloba* has a narrower hairy corolla-tube, and very narrow deeply cleft lobes.

Culture &c. as above. Sandy soil in sheltered parts of the rockery.

P. nivalis. — A beautiful Caucasian species, with thickish finely toothed leaves 1–6 in. long, smooth, and often powdery beneath. Flowers in spring, lilac-purple, about ¾ in. across, 2–10 in an umbel on glaucous scapes 3–18 in. high.

The variety *farinosa* has the under surface of the leaves covered with a whitish meal or powder; *longifolia* has much longer and narrower leaves, mealy beneath, and deep purple flowers; and *turkestanica* has deep rosy flowers usually arranged in two whorls.

Culture &c. as above. Moist sandy peat in the rockery or border.

The plants often called *nivalis* and *nivea* in gardens are really synonyms of *P. pubescens alba*.

P. obconica (*P. poculiformis*). — A beautiful Chinese Primrose 6–12 in. high. Leaves stalked, wrinkled, roundish heart-shaped with obscure, toothed lobes, or nearly entire. Flowers in spring and summer, ¾–1 in. across, pale lilac or purple, or nearly white, 12–20 in an umbel at the top of the scape. Calyx like an inverted cone, pale green.

Culture and Propagation.—This beautiful plant is largely grown in pots for conservatory decoration, and is remarkable for the elegance and abundance of its blossoms. It may however be grown successfully in the open air in the border or rockery, in rich sandy loam and leaf soil, and in situations somewhat shaded from the hot summer sun. It is probably too tender to stand frosty winters unprotected; seeds, however, are easily raised in spring or autumn, and plants from the later sowing may be wintered in cold, dry, airy frames until May.

Although *Primula obconica* has no irritating effect on most people, there are many, however, who suffer more or less intensely from eczema or eruptions of the skin after handling it.

P. obovata.—A natural hybrid between *P. Balbisi* and *P. tyrolensis*. Leaves obovate-obtuse, hairy, about 1 in. long, finely serrate. Flowers in April and May, pale rose or purple, several on a stout scape.

Culture &c. as above. Moist sandy soil in the rockery.

P. obtusifolia.—A Himalayan species, with variable leaves 2-5 in. long, usually blunt, and smooth or powdery beneath. Flowers in May and June, ruby-red, rarely yellow, in umbels on the top of the scapes which are 6-10 in. high.

Culture &c. as above. Moist sandy loam or peat in sheltered sunny parts of the rockery.

P. officinalis (*P. veris*). — *Cowslip; Paigle.*—A well-known British species 4-12 in. high. Leaves oblong spoon-shaped, wrinkled, with winged stalks. Flowers in April and May, bright yellow, drooping, funnel-shaped.

Culture &c. as above. In moist cool borders or the edges of shrubberies, or rockeries, woodland walks, banks &c. the Cowslip may be appropriately grown. It can be easily divided like the Common Primrose or Polyanthus. The latter is supposed to be derived from it through a form called *variabilis*. See POLYANTHUS (p. 620).

P. Olgæ.—A pretty species related to the true *P. nivalis*, native of Turkestan. Leaves ovate-oblong, with winged stalks, smooth and shiny on both surfaces. Flowers in spring, rosy-lilac or purple, few on a scape 3-4 in. high.

Culture &c. as above. Moist sandy loam or peat in the rockery.

P. Palinuri. — A vigorous Italian species 6-9 in. high. Leaves broadly spoon-shaped, smooth, sharply and unequally toothed, 3-4 in. long. Flowers in April and May, bright yellow, funnel-shaped, in a drooping umbel at the top of a powdered scape, like the Cowslip.

Culture &c. as above. Deep rich sandy soil in corners of the rockery. Easily increased by dividing the crowns in spring.

P. Parryi.—A beautiful Rocky Mountain Primrose 6-18 in. high. Leaves erect, narrowly oblong-obovate, bluntish, tapering to a broad stalk, obscurely toothed or entire, 5-9 in. long. Flowers in spring, about 1 in. across, bright purple with a yellow centre, 12 or more on stout scapes about 1 ft. high.

Culture &c. as above. Flourishes in very moist sandy loam and peat, and requires partial shade from the hot summer sun.

P. pedemontana.—A beautiful species about 6 in. high, native of Piedmont, and closely related to *P. viscosa*. Leaves oblong or ovate, slightly toothed with fringed edges. Flowers in spring, rosy-purple, with a yellowish-white centre, in dense heads on scapes 2-4 in. high.

Culture &c. as above. Rich moist sandy loam in the rockery or border. May be increased by division.

P. petiolaris.—A very variable Primrose, native of the Himalayas at an elevation of 9000-11,000 ft. It has stalkless oblong or spoon-shaped leaves, and produces lilac-purple flowers about 1 in. across, with a white and yellow eye, during the winter months, the petals being obcordate and toothed on the margins. The variety *nana* is a dwarf form with very short flower-stalks.

Culture and Propagation.—Although a hardy and very free-flowering species, the flowers unfortunately are produced during the worst season of the year, when they are apt to be spoiled by frost. This however may be prevented by covering the plants with handlights, or a sheet of glass supported by a couple of pieces of wire. From May to October the plants must be kept in a damp and shaded part of the garden, although they cannot have too much sun during our cheerless winters. The seeds should be sown as soon as ripe, and the plants are perhaps on the whole best grown in pots so that they can be readily moved as required.

P. pinnatifida. — A Chinese species with long-stalked ovate or oblong pinnately cut leaves. Flowers in July, violet, with entire lobes, and a long cylindrical tube.

Culture &c. as above. Moist sandy soil in cool shady parts of the rockery.

P. Plantæ.—A hybrid between *P. viscosa hirsuta* and *P. daonensis*, with tufted rosettes of ovate pointed, finely toothed leaves, covered with brownish hairs. Flowers in April and May, rosy-purple.

Culture &c. as above. Rich moist sandy loam in the rockery.

P. Poissoni.—A distinct species native of N. China. Leaves oblong lance-shaped, 4-6 in. long, slightly wavy, sharply toothed. Flowers in June and July, about 1 in. across, deep purple with a bright yellow centre, 6-8 in whorls on the upper portion of a stout scape 6-10 in. high.

Culture &c. as above. May be grown like *P. japonica.*

P. Portæ.—A Tyrolese hybrid between *P. Auricula* and *P. daonensis*. Leaves small, clammy, obovate, toothed towards the apex. Flowers in April and May, wine-red, several on a scape.

Culture &c. as above. Rich loamy soil in the rockery.

P. prolifera.—A pretty Primrose, 6–24 in. high, from the Himalayas. Leaves oblong obovate, finely toothed, 4–6 in. long. Flowers in summer, ¾ in. across, yellow, in few-flowered whorls at the top of a tall scape.

Culture &c. as above. This species flourishes in rich sandy loam in borders. Too tender in northern parts for frosty winters. Easily raised from seeds in early spring.

It may be remarked here that this species was at one time confused with *P. imperialis* from the mountains of Java, a quite different plant altogether, see p. 610.

P. pubescens.—A fine hybrid between *P. Auricula* and *P. viscosa*, 3–6 in. high, native of the Alps. Leaves oblong-obovate, toothed towards the apex, margins densely ciliate. Flowers in April, rosy-crimson, in large heads. The variety *alba* (better known in gardens as *nivalis* and *nivea*, and sometimes as *viscosa nivalis*) is a pretty tufted plant with broadly oblong ovate, toothed, slightly powdery leaves, and pure white flowers in clusters just above the foliage, each blossom being about 1 in. across.

Culture &c. as above. Deep moist sandy loam in the rock garden.

P. pulchra. — A pretty Himalayan Primrose with smooth, oblong or ovate wavy leaves, glaucous beneath, and rounded or lobed at the base. Flowers about 1 in. across, purple, with a funnel-shaped tube.

Culture &c. as above. Moist sandy peat and loam in the rockery.

P. pumila.—A pretty hybrid between *P. minima* and *P. daonensis*, native of the Tyrol. Leaves ½–¾ in. long, wedge-shaped, with 7–9 large triangular teeth near the apex; margins glandular. Flowers in April and May, rosy-purple, 2 or more on a hairy scape about 1 in. high. Calyx tubular-bell-shaped.

Culture &c. as above. Chinks between rocks in free moist sandy soil.

P. purpurea.—A handsome species, 6–10 in. high, from the mountains of Nepaul, closely related to *P. denticulata*. Leaves bluntly lance-shaped, smooth, notched and wavy on the margin, and covered with a yellow powder beneath; leaf stalk winged, dilated at the base, somewhat sheathing. Flowers in spring and early summer, exquisite dark purple, in large umbels, sometimes having 50 flowers.

Culture &c. as above. Sheltered, warm, and sunny nooks of the border or rockery, at the foot of large stones or rocks, in deep sandy loam and leaf soil. The crown is apt to rot with excessive wet in winter, and should therefore be protected with a piece of glass.

P. pusilla (*P. humilis*). — A densely tufted hoary plant, found on the Himalayas at an elevation of 13,000–16,000 ft. Leaves ½–1 in. long, spoon-shaped, oblanceolate, pinnatifidly toothed. Flowers in spring, about 1 in. across, violet-purple, 1–4 on a slender scape about 2 or 3 in. high.

Culture &c. as above. Moist sandy loam and peat in cool shaded parts of the rockery.

P. Reidi. — A charming little Himalayan Primrose, a couple of inches or so high. Leaves wrinkled, oblong or oblong-lanceolate, with small toothed or crenate lobes, and somewhat downy. Flowers in May, about 1 in. across, ivory-white, fragrant, drooping, bell-shaped, several on a stiff scape.

Culture &c. as above. Moist peat and sandy loam in sheltered nooks of the rockery. This little gem is best grown in pots, as it is too valuable to be risked without protection in winter.

P. reticulata.—A native of the Himalayas at an elevation of 11,000–15,000 ft. Leaves on long stalks, oblong heart-shaped, blunt, doubly crenate, netted, glaucous beneath. Flowers in late spring, yellow, funnel-shaped, on scapes 6–12 in. high,

Culture &c. as above. Rich sandy loam and peat in exposed parts of the rockery.

P. rosea.—A handsome species about 4 in. high, native of Kashmir. Leaves bright pale green, smooth, 3–6 in. long, edges slightly serrate and crimped.

Flowers in spring, about 1 in. across, bright rosy-carmine, with a yellow centre, 6–10 on stout scapes 4–6 in. high. The variety *grandiflora* has larger and finer flowers.

Culture &c. as above. Moist loamy soil in sheltered and partially shaded parts of the rockery. It is easily increased by division.

P. rotundifolia.—A native of the Himalayas at an elevation of 12,000–14,000 ft. Leaves on stalks 2–3 in. long, with roundish, heart-shaped toothed blades, 1–2 in. long. Flowers in June, ¾ in. across, bright rose with a yellow eye, 3–4 on a somewhat powdery scape 4–6 in. high.

Culture &c. as above. Sandy loam in the rockery.

P. Rusbyi.—A native of New Mexico, with oblong spoon-shaped, finely toothed leaves. Flowers in spring, deep purple with a yellow eye, 6–10 in an umbel on scapes 5–10 in. high. The calyx has mealy white triangular patches running up between the lobes from the base.

Culture &c. as above. Rich, moist, sandy loam in sheltered parts of the rockery.

P. salisburgensis.—A hybrid between *P. glutinosa* and *P. minima.* Leaves wedge-shaped, blunt, with acute triangular teeth towards the top. Flowers in April and May, rather large, reddish-purple, several in a head.

Culture &c. as above. Moist, peaty soil and moss in the rockery.

P. sapphirina. — A minute species, native of Sikkim, at an elevation of 13,000–15,000 ft. Leaves obovate spoon-shaped, blunt, toothed, in rosettes about ½ in. across. Flowers in early summer, pale blue or purple, nodding on slender scapes, 1–2 in. high.

Culture &c. as above. Several plants should be grown together in patches in well-drained sandy loam and peat in the rockery.

P. scotica.—A lovely Scottish Primrose, 2-4 in. high, perhaps only a distinct variety of the Bird's Eye Primrose (*P. farinosa*). Leaves obovate, lance-shaped, toothed, powdered on both sides. Flowers from June to September, rich purple with a yellow centre, few on an umbel.

Culture &c. as above. Rich, loamy soil at the foot of rockeries, or borders. Best treated as a biennial, as it often disappears after the second year. For the general treatment of biennials see p. 78.

P. secundiflora.—A beautiful Chinese species. Leaves papery, covered with golden powder, oblong or ovate-oblong, serrulate, on broadly winged stalks. Flowers in July, intense violet, with broadly obovate, entire corolla lobes.

Culture &c. as above. Sandy well-drained loam in sheltered parts of the rockery.

P. septemloba. — A softly downy Chinese species with roundish, deeply heart-shaped leaves cut into 7 broadly ovate obtuse lobes. Flowers in July, purple, with obovate, slightly notched lobes.

Culture &c. as above. Sandy loam and peat in sheltered parts of the rockery or border.

P. serratifolia. — A smooth Chinese species with thin papery oblong or obovate leaves with long winged stalks. Flowers in June, golden-yellow, 5–10 in an umbel.

Culture &c. as above. Moist, loamy soil or peat in sheltered positions.

There is another Primula called *serratifolia* from the Tyrol, a hybrid between *P. minima* and *P. wulfeniana.*

P. sibirica.—A Siberian species about 3 in. high, with long-stalked, smooth, obovate wavy leaves. Flowers in May, bell-shaped, red, 3–5 in an umbel. The variety *integerrima* has quite entire leaves.

P. finmarchica from Lapland is closely related to *P. sibirica*, but may be distinguished by its lance-shaped leaves and dark lilac blossoms.

Culture &c. as above. Moist sandy loam and leaf soil in the rockery or border.

P. Sieboldi (*P. amœna*).—A beautiful Japanese Primrose, related to *P. cortusoides*, 8–12 in. high, with creeping roots and ovate, coarsely, and irregularly toothed and lobed leaves 2–3 in. long, deciduous in winter. Flowers in April and May, 1–2 in. across, deep rose with a white eye, 6–10 in an umbel. A large number of seedling varieties have been obtained from this species. Many of them are very fine, with flowers varying in colour from rose to lilac, lavender, mauve, pale blue &c., to which fancy names, like 'Mauve Beauty' and 'Lavender Queen,' have been given.

Culture and Propagation.—P. Sieboldi and its many varieties flourish in rich, well-manured and well-drained sandy loam and leaf soil. They are easily increased by seeds sown in spring or by dividing or cutting up the creeping roots which form 'eyes' or buds, from which young plants grow. May be associated with *P. japonica* in half-shady parts of the border, the rockery, or wild garden.

P. sikkimensis.—This beautiful species 1½–2 ft. high is found growing in wet, boggy places in the Sikkim Himalayas at elevations varying from 12,000–17,000 ft. Leaves roughish, wrinkled, obovate oblong, blunt, toothed, tapering into a stalk. Flowers in May and June, more than ½ in. across, pale yellow, bell-shaped, drooping, fragrant, in large umbels sometimes containing as many as 60 blossoms; scapes stout, erect, 1½–2 ft. high.

Culture and Propagation.—This species loves deep, moist, peaty soil and somewhat shaded situations, either in the rock garden, the edges of ponds or streams, or the wild garden, where it should be grown in large patches in swampy spots to give a sheet of yellow bloom. It may be increased by seeds sown as soon as ripe, or by careful division in spring, just as the new leaves are beginning to sprout. It is probably better treated as a biennial in some localities than a perennial.

P. similis.—A robust Styrian hybrid between *P. Balbisi* and *P. Auricula.* Flowers in April and May, yellow.

Culture &c. as above. Rockery or border in sandy loam and leaf soil.

P. soldanelloides.—A native of the Sikkim Himalayas, with ovate leaves ¼–½ in. long, irregularly and pinnately lobed and toothed. Flowers in early summer, white, large, nodding, one on a scape, with a long cylindrical tube and spreading bilobed segments.

Culture &c. as above. Moist sandy loam and peat in the rockery.

P. sonchifolia.—A Chinese species related to *P. obtusifolia*, but distinguished by its smooth, almost runcinate, oblong or obovate leaves or broadly winged stalks. Flowers in June, violet.

Culture &c. as above. Moist sandy loam and peat or leaf mould in sheltered sunny parts of the rockery.

P. spectabilis.—A native of the Eastern Alps, about 4 in. high. Leaves thick and fleshy, elliptic, with entire cartilaginous margins. Flowers in July, deep rose-purple, 6–8 in an umbel, on scapes 3–4 in. high.

Culture &c. as above. Sandy loam with a little chalk and leaf mould in exposed parts of the rockery.

P. spicata.—A remarkable Chinese species with papery ovate-oblong, doubly crenate leaves on narrowly winged stalks. Flowers in June, violet, on one-sided spikes, an unusual character in Primulas.

Culture &c. as above. Sandy loam and leaf soil in the rockery.

P. Steini.—A Tyrolean hybrid between *P. minima* and *P. viscosa hirsuta.* Leaves in large rosettes, obovate spoon-shaped, with 7–9 large teeth towards the apex, and a few glandular hairs along the edges. Flowers in April in great profusion, violet-purple with a white centre, 3–4 on a scape 1–2 in. high.

Culture &c. as above. The rockery in moist sandy loam and leaf soil.

P. Stuarti.—A beautiful strong-growing species 9–18 in. high, native of the mountains of N. India. Leaves about 1 ft. long, broadly lance-shaped, sharply toothed, smooth above, powdered beneath. Flowers in summer, bright golden-yellow, many in an umbel. The variety *purpurea* (also known as *P. jæshkiana*) has broad rarely toothed leaves, white or yellow beneath, and pale or deep purple flowers often in 2 whorls.

Culture &c. as above. Deep moist sandy loam and leaf soil in sheltered parts of the rockery or border.

P. Sturi (*P. minima pubescens*).—A Styrian hybrid between *P. minima* and *P. viscosa.* Leaves about 1 in. long, wedge-shaped, hairy, coarsely toothed near the truncate apex. Flowers in April and May, rose-purple, large and freely produced.

Culture &c. as above. Moist sandy loam and leaf soil in the rockery.

P. suffrutescens.—A pretty Californian Primrose with long straggling rather woody stems and rosettes of evergreen narrow wedge-shaped spathulate leaves, 1½–2 in. long, toothed at the apex. Flowers in spring, 1 in. across, rosy-purple, with a yellow eye, and borne in umbels of 3–7 on scapes 3–4 in. high.

Culture &c. as above. Rather sheltered parts of the rockery in well-drained soil.

P. tenella. — A native of Eastern Thibet, 2–3 in. high. Leaves powdered all over, wedge-shaped and entire below the middle, toothed towards the apex. Flowers in early summer, large solitary bluish-white, with obcordate corolla-lobes.

Culture &c. as above. Sandy loam and leaf soil in sheltered nooks of the rockery.

P. Trailli.—A pretty Himalayan Primula with oblong spoon-shaped crenate leaves about 6½ in. long, abruptly narrowed into a stalk. From 3 to 6 drooping or horizontal sweet-scented flowers are borne at the top of a slender scape 12–16 in. high. The obcordate notched petals are blush-white with a deeper coloured eye.

Culture &c. as above for *P. involucrata.*

P. uniflora.—A charming little Himalayan species, with roundish or broadly ovate pinnatifidly crenate leaves about ½ in. long. Flowers in early summer, pale lilac, larger than the whole rosette of leaves, 1–2 on a slender scape. Corolla lobes shallow, unequally toothed.

Culture &c. as above. This little species, and all others like it, should be grown in patches, as single plants are likely to get overlooked and lost. Moist sandy soil and leaf mould in sheltered parts of the rockery suit it well.

P. variabilis. — A hybrid between a form of the Common Primrose (*P. vulgaris*) and the Cowslip (*P. officinalis*) occasionally found wild in the British Islands, and often mistaken for the true Oxlip (*P. elatior*). The garden Polyanthus has been developed from this hybrid.

Culture &c. as above. Ordinary good garden soil in more or less shady positions.

P. venusta.—A Hungarian Primrose (probably a hybrid between *P. Auricula* and *P. carniolica*) about 3 in. high, with ovate toothed, or nearly entire leaves, smooth on both surfaces. Flowers in April, purple, borne on smooth scapes.

Culture &c. as above. Rich sandy loam in the rockery.

P. Venzoi. — A densely tufted Tyrolese hybrid between *P. tyrolensis* and *P. wulfeniana.* Leaves about 2 in. long, ovate lance-shaped, pointed, slightly crenate, hairy, and densely pitted. Flowers in April, 1 in. across, pale purple, 1–3 on a scape ; corolla lobes deeply notched.

Culture &c. as above. Well-drained sandy soil and leaf mould in the rockery.

P. vinciflora.—A remarkable looking Chinese species 3–9 in. high, with oblong wedge-shaped ciliated leaves, covered with reddish glands and overlapping each other like the scales of a bud, the smallest leaves being at the base. Flowers in early summer, about 1½ in. across, purple-violet, with a long downy tube swollen at the base, solitary, on hairy scapes. Corolla lobes obcordate wedge-shaped, giving the flowers very much the appearance of those of a *Vinca* (see p. 645).

Culture &c. as above. Rather sheltered sunny parts of the rockery in moist well-drained soil.

P. viscosa (*P. villosa*).—A charming Pyrenean species 2–4 in. high, with obovate or roundish deep green, hairy leaves, having close-set teeth, and somewhat clammy on both sides. Flowers in early summer, rosy-purple, with a white eye, several in an umbel on clammy scapes just above the foliage; corolla lobes heart-shaped, deeply notched. There are several varieties, the best known being:—*ciliata*, a vigorous form with larger and more numerous flowers; *commutata*, with large bright rose flowers in May and June, and entire or slightly toothed leaves; *confinis*, with small toothed clammy leaves and large bright deep rosy flowers; *hirsuta*, a charming variety with large rosettes of deeply and sharply toothed soft hairy leaves, and pale lilac flowers with a whitish centre. *P. decora* and *P. pallida* are both similar to this variety; *Nelsoni* is probably a seedling garden form, with pale purple or pink flowers.

Culture and Propagation. — *P. viscosa* and its several varieties may be grown in light sandy loam and peat or leaf mould which should be moist but well drained. They may be increased by carefully dividing the growths in early autumn or spring, as well as from seeds. They are beautiful plants for the rockery in nooks and corners, between pieces of rock.

P. vulgaris (*P. acaulis*). — *Common Primrose.*—A well-known British plant about 3 in. high, with a stout rootstock and obovate spoon-shaped deeply veined leaves 3–6 in. long in dense tufts. Flowers in April and May, 1-1½ in. across, soft yellow, rarely white, lilac, or purplish, with slightly notched, roundish corolla lobes. Umbels sessile, so that the pedicels resemble scapes.

Notwithstanding the undoubted charms of the exotic species and hybrids described above, the grace and beauty of our Common Primrose are difficult to equal or surpass. The inclination to vary in colour from the normal yellow has been promptly noted and utilised by gardeners, and now there are many fine coloured varieties in cultivation, including shades of red, lilac, rose, mauve, bluish-violet &c. Some have been given names, and among these may be mentioned: *Crimson Banner*, deep brownish-crimson; *Brilliant*, rich vermilion-red; *Fairy Queen*, pure white; *King of Crimsons*, bright rich crimson; *Virginia*, pure white; *Violetta*, beautiful violet-purple; *Queen of Violets*, deep purple-violet; *Scott Wilson*, bluish-purple, and many others. The so-called 'Blue' Primroses, to which Mr. G. F. Wilson of Weybridge has devoted so much attention, are represented by the last 3 varieties above mentioned. So far a really 'blue' Primrose has not yet been developed, but with careful and continual selection of the deepest purple and violet shades that colour may be ultimately reached. A very fine large-flowered form of the Common Primrose, called *Evelyn Arkwright*, has appeared within the past few years. The blossoms are of a beautiful soft yellow, and close on 2 in. across, while the plant as a whole is very vigorous, somewhat looser in habit and with larger leaves than the ordinary type.

Besides the single-flowered varieties, there are also many beautiful double ones with almost as great a range of colouring—white, lilac, purple, rose, crimson, and yellow being represented, often with fancy names.

Culture and Propagation. — The Common Primrose is easily grown in rich moist loamy soil and leaf mould, and may be used in a variety of ways to make the garden beautiful in spring. Shaded banks, the edges of borders or shrubberies, nooks and crannies of the rockery, are a few of the suitable places for it. Indeed there is no reason why it should not invade suitable out-of-the-way corners in the kitchen garden where it will not be much interfered with, and allowed to grow as in a state of nature.

The plants may be increased by dividing the growths after flowering and planting them in rich soil, taking care to well water them and to shade from the sun. Seeds may also be sown as soon as ripe, and a large number of plants can thus be obtained for flowering the following spring.

The 'Blue' and coloured varieties being more or less the result of the gardener's handiwork are not quite so vigorous as the Common Yellow Primrose, nor do they seed so freely. The offsets must be very carefully detached, as they are only sparingly produced, and are best cultivated in pots until a sufficiently large stock has been raised to admit of planting out, when they must receive the same rich soil and shady positions required by the Common Primrose. These remarks also apply to the double varieties, and it may be stated as a fact that the nearer the flowers approach blue the more delicate and the more difficult to grow and increase are the plants bearing them as a rule.

P. wulfeniana.—A vigorous Alpine species related to *P. spectabilis*, with lance-shaped spathulate pointed shining green leaves having rough cartilaginous margins. Flowers in April and May, large, deep purple-violet.

Culture &c. as above. Moist sandy loam with a little chalk or lime in the rockery.

P. yunnanensis.—A beautiful Chinese species closely allied to the Himalayan *P. uniflora*. Leaves ovate-oblong, crenular, mucronate, smooth, on short narrowly winged stalks. Flowers in July, violet-purple, with ovate, entire corolla-lobes.

Culture &c. as above. In rich soil between pieces of limestone rock.

AURICULA (PRIMULA AURICULA).—Since the seventeenth century the Auricula has received particular attention from gardeners in England and on the Continent, chiefly Holland, but for centuries before that had been a favourite flower, and there is little doubt that as we know it to-day the Auricula has been obtained by crossing and intercrossing varieties not only of *P. Auricula* proper but others nearly related. At one time cottagers, especially in Lancashire, were very keen on growing Auriculas, and new varieties were being continually raised and 'improved,' until in 1850 there were enumerated about 1200 varieties.

Auricula flowers exhibit all shades and combinations of yellow, maroon, and purple, usually in concentric rings, either smooth in the 'Alpine' varieties or more or less densely covered with a mealy powder or paste, which also covers the stems and leaves as in the 'Show' varieties.

There is also a good deal of variation in the density of the powdery thickening on the leaves. Some are very heavily coated and appear quite white, and for this reason the Auricula is known north of the Tweed as the 'Dusty Miller.' The Show Auriculas are divided into four groups as follows:—

Green-edged. — Outer edge of the flowers green, sparingly dusted with powder, and surrounding a darker-coloured zone called the body colour, being black, maroon, or rarely red. Within this is a broad pure dense zone called the 'paste,' in the centre of which is the yellow or golden throat. None of the green-edged varieties has powdered leaves.

Grey-edged. — Edge heavily dusted with powder almost obscuring the green colour beneath and thus giving a greyish appearance. The body coloured zone, 'paste' zone, and throat are the same as in the green-edged varieties.

White-edged. — Outer edge densely covered with white powder, completely hiding the green colour beneath, and almost as dense as the 'paste' zone. Other characters like the green-edged.

Selfs. — These have a golden-yellow throat, and a zone of paste, outside which is another zone of a different colour extending to the extreme edge.

The *Alpine Auricula* (probably descended from *P. pubescens*) is distinguished by various shades of yellow or white in centre and an outer zone of one colour, or two colours blended together, and without any powder. The 'Laced' Alpine Auriculas have distinct and well-defined pale edges outside deeper colours. There are also Alpine Auriculas with double flowers, at present but little known.

'Fancy' Auriculas, obtained from the seeds of the 'Show' varieties, have a zone of deep gold in place of the dark body colour, and a brilliant green edge, gold and yellow being the predominating features of the flowers.

The ideal florist's Auricula is supposed to have a perfectly circular outline, with the corolla-lobes neither pointed nor indented, and each zone of colour should be clear, well-defined, and with a regular outline. The throat should be regular and filled with anthers, making the flowers 'thrum-eyed,' in contradistinction to those in which the roundish stigma appears, making the flowers 'pin-headed' or 'pin-eyed.' Of course it is impossible to obtain flowers exactly conforming to these ideals in every detail, but they represent what florists are aiming at. The results of their labours may be seen at the exhibitions held annually about April, but to attain like results special care and treatment in cold frames are necessary. So that the beginner may not be disappointed if he undertakes the cultivation of the 'Show' or 'Edged' Auricula, it may be as well to mention that when raised from seeds only about one plant out of every hundred will be worth growing, the others having reverted more or less to the natural state, although the seeds may have been obtained from the very finest varieties. Choice forms therefore are only kept true when increased by dividing the plants or taking the offsets, and putting them in good soil in close cool frames shaded from the sun.

For outdoor gardening the Alpine Auriculas are the more free and vigorous growing, but a packet of seeds of the Show varieties will yield excellent plants with a great range of variation.

Culture and Propagation. — Auriculas flourish in light loamy well-drained soil with plenty of leaf mould. They like plenty of moisture at the root during growth, and in hot dry seasons a little covering of well-rotted manure or coco-nut fibre will keep the soil nice and cool, and prevent excessive evaporation.

Auriculas are easily increased by sowing seeds in February or March in gentle heat or in cold frames. Pots or pans may be used with sandy loam, well drained by crocks or pieces of charcoal. The seeds should be sown about 1 in. apart; they germinate slowly, but when 4–6 leaves are made the seedlings may be transferred singly to small pots. Do not throw away the weaker plants, as very often they become vigorous after transplanting and have blossoms superior to the ranker-growing kinds. It is also an excellent plan to sow the seeds of Auriculas in cold frames as soon as ripe. By spring most of the seeds will have germinated, and when large enough may be pricked out into light rich soil.

The plants may also be divided in spring, but better still in early autumn.

POLYANTHUS. — The Garden Polyanthus has been mainly derived from *Primula variabilis*—itself a hybrid between the Common Primrose and the Cowslip (see p. 617). Unlike the Primrose, the umbels of flowers are not concealed among the leaves, but are thrown well up on a stalk as in the Auricula; otherwise the vegetative characters are very similar. A packet of seeds will give an immense variety in colour and size, and by saving seeds from the finest flowers with the most clearly defined colours, beautiful varieties are obtained, the individual flowers often being almost as broad as an ordinary watch. The flowers from the expert's point of view should be large, flat, but not absolutely circular as in the Auricula. The ground colour should be rich and dark, and uniform, with a clear lemon-gold centre. The edge should be clear and golden in colour, matching the centre, while the mouth of the tube should be regular and well-defined, and even slightly raised above the level of the centre. It should also be 'thrum-eyed' in preference to 'pin-eyed,' that is, the anthers, and not the stigma, should fill the orifice. These are the characteristics of the 'Gold-laced' Polyanthus, to which must be added that the ground or body colour, that is the zone between the centre and the edge, may be of a dark rich velvety crimson-red or velvety red, but quite free from specks or blemish, and perfectly clear and unshaded.

'Fancy' or Giant Polyanthuses are an ornamental and vigorous race, with strong trusses of variously coloured flowers, from pure white and yellow to deep purple and crimson.

The 'Primrose' Polyanthuses are those which at first throw up apparently single flower stems like the Primroses, but later on the scape elongates and bears its umbel in true Polyanthus fashion.

It is quite unnecessary to abide by the arbitrary rules laid down by florists, and many beautiful forms will be found which do not conform to their more or less conventional ideas.

Like the Primrose there is no end of the uses to which the Polyanthus may be put in the flower garden. Grown in beds or masses they form lovely pictures in spring, especially if plants of the same variety are grouped together. In clumps in shaded parts of the rockery, in crevices and nooks facing west or north they are as good as the choicest alpines; while as edgings to shady borders or margins of shrubberies they are equally bright and pleasing.

There are innumerable varieties, some having yellow, white, and crimson colours throughout and known as 'selfs.' Between these there are all kinds of intermediate shades. Then there are the 'Hose-in-Hose' varieties, in which the calyx has been modified and become an exact counterpart of the corolla in shape and colour. *Erin's Yellow*, *Danesfort Yellow*, are fine yellow Hose-in-Hose forms, and there are also others with creamy white, crimson, and scarlet flowers. *Pantaloons*, *Rex Theodore*, *Tortoise-shell* and *Golden Ball* are well-known varieties, the three latter with double flowers. Some of the very oldest and most famous varieties have disappeared from cultivation, but others perhaps equally as good will take their place in due course.

Culture and Propagation. — The Polyanthus thrives in any fairly rich soil in rather moist or more or less shady situations. After flowering is well over and the leaves begin to turn yellow, the plants may be pulled to pieces and replanted in shady places to make fine flowering clumps the following spring. Seeds sown as soon as ripe will germinate freely, and in this way a large quantity of plants can soon be raised. The choicer varieties are best sown in shallow pans or boxes, as they are more easily attended to than if sown in the open border. If intended for exhibition the plants are grown in pots, or lifted early in spring and put into pots and then grown on in cold frames, so that the flowers may be protected from injury by rain and frost, and appear brighter and clearer. In gardens where Polyanthuses flourish they multiply themselves naturally from seeds which fall from the globular seed-case when ripe.

It is therefore only necessary in such cases to transplant the seedlings in mild showery weather to keep up a good supply and perhaps secure improved varieties. Where, however, it is desired to keep any particular variety true to colour the only sure way to increase it is by division of the tufts.

ANDROSACE.—A genus containing about 40 species of small tufted alpine annuals or perennials with sessile or stalked, entire, serrate, toothed, or incised-lobed leaves. Flowers small, often white or rose. Calyx 5- cleft or parted. Corolla hypogynous, salver-shaped or funnel-shaped, with a short tube constricted at the mouth, and 5 oblong, wedge-shaped or obcordate imbricated lobes. Stamens 5. Ovary superior, round, or turbinate; style usually short. Capsule ovoid or round, few- or many-seeded.

Culture and Propagation.—Androsaces as a rule are found high up on the mountain sides amid frost and snow, and are intensely hardy. They like to grow in the chinks and fissures formed by big stones in the rockery, sending their roots into a deep, rich, sandy peat soil, or sandy loam. They suffer from drought and stagnant moisture, and should be so raised up by means of small pieces of sandstone that the winter rains drain readily away from them, especially the woolly-leaved kinds, which are apt to retain the wet much longer than the smoother kinds. Many of them may be grown in pots in cold frames, and the choicer kinds may be sunk here and there in the rockery from spring to autumn, and then transferred back to the frames for protection from the wet during the winter months.

Androsaces may be increased by careful division in autumn or spring, by cuttings inserted in sandy soil in cold frames; or by seeds sown as soon as ripe in shallow pans or boxes and raised in cold frames. The seedlings should be pricked off into light soil when large enough, and are safer wintered in cold frames until mild weather in spring.

A. albana. — A pretty biennial or perennial native of the central and eastern Caucasus, where it grows at an elevation of 8000–10,000 ft. It makes pretty little rosettes of bright green leaves toothed on the margins, and from April to July produces dense compact umbels of pinkish-white flowers.

Culture &c. as above. This species flourishes in light sandy soil, in open sunny situations. It is easily reproduced from seed and may be treated as a biennial.

A. alpina (*A. glacialis*). — A pretty Swiss species 2–3 in. high, with small rosettes of crowded tongue-shaped leaves. Flowers in June, solitary, purplish-rose, throat and tube yellow, on stalks about ½ in. long.

Culture and Propagation.—Requires a rather shaded situation, and should be planted almost perpendicularly in a mixture of peat, loam, leaf-soil and sharp sand, between the chinks of rock or stone.

A. argentea (*A. imbricata*).—A Swiss species about 2 inches high. Leaves closely overlapping, lance-shaped oblong, covered with short hairs, forming silver-grey rosettes. Flowers in June, white, very numerous, without stalks.

Culture &c. as above. Best in a sunny chink in well-drained soil.

A. carnea (*A. Lachenali; A. puberula*).—A charming little Swiss evergreen 3–4 in. high, with smooth awl-shaped pointed leaves not in rosettes. Flowers from May to July, pink or rose, about 1½ in. across, with a yellow eye, 3–7, on hairy stalked umbels.

This plant is best left alone for a few years in rich, well-drained soil, when it will make fine mossy masses of foliage, just above which appear the bright little flowers.

The variety *eximia* is a more vigorous and rapid-growing plant, forming dense rosettes of leaves, above which on stalks 2–3 in. high are borne heads of rosy-crimson flowers with a yellow centre.

Culture &c. as above. It requires moist sunny ledges in chinks, in deep sandy loam and peat.

A. caucasica.—A pretty dwarf species native of the Caucasus, where it grows at an elevation of 10,000–11,000 ft. The leaves are narrow and toothed, and form more or less dense rosettes from the centre of which the bright pink flowers appear in dense umbels during the summer months.

Culture and Propagation.—As this species is more or less biennial in character it should be raised from seeds every year to keep up a supply. It will flourish in sandy peat, loam and leaf soil, and may be planted in rather shaded positions between the crevices of rocks and stones in the rock garden.

A. Chamæjasme.—A beautiful alpine, 3–5 in. high, native of the Tyrolese, Swiss, and Austrian Alps. Leaves lance-shaped, acute, fleshy, tapering towards the base, and forming large but not dense rosettes. Flowers in June, white or blush, changing to deep pink, with a yellow centre, in umbels on short stout stems.

Culture &c. as above. This is closely related to *A. villosa* described below. It flourishes in deep, well-drained, rich, loamy soil in the rockery, and is very free when once established.

A. Charpentieri. — According to M. Correvon 'this is one of the rarest and most remarkable of the Androsaces, rare as it only grows on the rocky ridges of two mountains which overlook the lake of Como, being found nowhere else in the whole world.' It grows in dwarf clumps close to the ground, and has rosettes of thick blunt downy leaves, and beautiful bright pink flowers with a paler centre.

Culture and Propagation.—Writing in the 'Gardeners' Chronicle,' M. Correvon says this interesting plant is not easily cultivated. It grows naturally in gravelly soil composed of scraps of granitic rock, between which it forces its fine and long white rootlets. The soil contains very little humus, and I have even seen young plants shooting up, growing, and developing in broken rocks which certainly did not contain a single scrap of vegetable mould. The crumbled rock, which is always moist, is sufficient for them; the roots and rootlets draw from it all that the plant requires to sustain life, just as the roots of certain rock plants, which creeping along the fissures of the bluffs draw thence all that they require for growth and development. Besides this, *A. Charpentieri* grows in full sun and light in a pure atmosphere charged with moisture. It is therefore a mistake to cultivate this plant in pots and in frames, as is usually done. This is how I succeed with it, and how I would advise it to be grown in England: I plant it upright, between the cracks of two blocks of granite, on a rockery with an eastern aspect, taking care that the fissure is open only on one side, so as to prevent the roots from being parched up. I keep it in place by means of little pebbles, which I put round the clump; for soil I put in the crack a mixture of small broken pebbles, granitic sand, and some turfy loam. By following this plan I succeeded in making my plant flower, but it has not produced seed. A root, however, transferred to the alpine garden and planted in a horizontal position in full sunshine, in poor and light soil, flowered and fruited well.

A. ciliata.—A handsome Pyrenean species 2–3 in. high, forming dense cushions of lance-shaped oblong leaves, smooth on both sides, fringed with hairs on the margins, and imbricated. Flowers in June, deep carmine-red or pinky-rose, just rising above the foliage.

Culture &c. as above. Exposed parts of the rockery in deep sandy soil.

A. cylindrica.—A native of the Central Pyrenees on the chalky rocks of St. Bertrand, and very rare. It grows from the rocks in large drooping tufts 2–6 in. long, and has narrow linear-lance-shaped leaves, more or less obtuse, closely set in rather cylindrical rosettes, and covered with simple and starry hairs. Flowers in July and August, solitary, small, white, on slender hairy stalks. Sepals lance-shaped acute, with a prominent green vein.

Culture &c. as above. Sunny fissures of the rockery, in sandy peat and loam.

A. foliosa.—A native of the Western Himalayas with a woody rootstock, having no runners, and sending up one or more very short stems. Leaves 2–3 in. long, elliptic or elliptic-oblong, blunt or acute, hairy. Flowers from May to September, pale flesh colour, about ½ in. across, many in an umbel on stalks 3–5 in. high.

Culture &c. as above. Warm sunny spots in the rockery in sandy loam and peat.

A. helvetica (*A. Aretia*).—An attractive Alpine and Pyrenean species about 1 in. high, forming dense cushions of small, lance-shaped, blunt, ciliated leaves, closely overlapping each other. Flowers in spring and early summer, white with a yellowish centre, on short stalks.

Culture &c. as above. This little plant requires sunny or slightly shaded positions between large stones in the rockery, and flourishes in sandy loam and peat.

A. hookeriana.—A native of the Swiss Alps with slender running stems or stolons bearing tufts or rosettes of stiff flattish blunt-tipped leaves, shiny above, sometimes hairy on the margins. The pretty pink flowers appear in summer and are borne in loose umbels on stalks about 3 in. high.

Culture &c. as above. This species grows in sandy loam and peat in the chinks and crevices of the rockery.

A. lactea (*A. pauciflora*). — A free-growing Austrian and Pyrenean kind 2–4 in. high. Leaves linear or nearly so, bright green, arranged in rosettes, sometimes scattered along the branches, and often fringed with short hairs, becoming deep red when old. Flowers in June, large, pure white with a yellow throat and heart-shaped petals, in umbels on long graceful stalks.

Culture and Propagation. — This prefers somewhat chalky soil in the rockery with an eastern or western aspect. It is best increased from seeds, but may also be divided carefully.

A. Laggeri. — A beautiful species about 3 in. high, native of the Pyrenees. It resembles *A. carnea* but is not quite so hardy. Leaves in tiny rosettes, awl-shaped, sharply pointed, deep green. Flowers in March, pink, at first sessile, the stem afterwards becoming 2–3 in. long, and bearing a tuft or dense umbel of stalked flowers.

Culture and Propagation.—Requires shady positions in the rockery, as it suffers somewhat from exposure to the glaring sun. It likes sandy loam and peat, and may be increased by seeds or cuttings, the latter rooting freely in sandy soil under a handlight or cold frame during the summer months.

A. lanuginosa. — A charming and distinct Himalayan species easily recognised by its long spreading stems 6–9 in. long, which drape the face of the rocks. Leaves about 1 in. long, clothed with shiny silken hairs. Flowers, about ½ in. across, in umbels from June to October, delicate rose, with a small yellow centre.

Culture and Propagation.—On ledges in the rockery in sandy loam and peat in warm sheltered spots, so that its shoots may spread over the face of the rock. It may be increased by seeds or cuttings like *A. Laggeri.* Grown in bold masses it makes a very fine picture in the rockery when covered with blossom.

A. macrantha.—A very distinct species native of Armenia. It is closely related to *A. septentrionalis*, and forms large rosettes of leaves which are slightly horned at the tips. During the summer months it produces rather stout spikes of pure white flowers with great freedom.

Culture &c. as above. This species is not yet well known. It is a vigorous grower, and flourishes in sandy loam and peat or leaf soil, in the rockery.

A. obtusifolia (*A. aretioides*). — A native of the Alps closely related to *A. Chamæjasme*, and 2–6 in. high with downy stems. Leaves in rather large rosettes, lance-shaped or somewhat spoon-shaped, smooth, 5–6 in an umbel. Flowers in spring or early summer, white or rose, with a yellow eye.

Culture &c. as above. It requires practically the same treatment as *A. Chamæjasme.*

A. pubescens.—A pretty little Alpine and Pyrenean species about 2 in. high, recognised by the small swelling on the stem close to the flower. Leaves in crowded rosettes, oblong ovate, or spoon-shaped, ciliated, clothed with whitish hairs. Flowers in June, white with a faint yellow centre, numerous, solitary at the ends of the short branches.

Culture &c. as above. Sandy loam and peat in sunny chinks of the rockery.

A. pyrenaica.—A tiny Pyrenean species often less than 1 in. high. Leaves narrowly oblong, ciliated, downy, keeled behind, recurved, and forming dense cushion-like tufts. Flowers in summer, white with a yellow eye, on stalks about ¼ in. high.

Culture &c. as above. This species flourishes in deep sandy loam and peat between pieces of stone in fissures of the rockery or on little mounds of stone.

A. rotundifolia macrocalyx.—A soft hairy Himalayan perennial with radical leaves 1–2 in. across, roundish heart-shaped, lobulate, stalked. Flowers in June, rosy, on slender scapes, numerous. Calyx ½–⅝ in. across, longer than the corolla.

Culture &c. as above. Warm positions in deep sandy loam and peat in the rockery.

A. sarmentosa.—A pretty Himalayan species forming dense silvery rosettes of oblong spoon-shaped hairy leaves, and numerous runners with tufts at the end. Flowers in May and June, bright rose, with a white or deep rosy eye, 10–20 in an umbel on an erect scape 6–9 in. high. Closely related to this species is *A. sempervivoides*, a native of Western Thibet. It may be distinguished by the leaves being curled up into a cone, and by the bright purple flowers.

Culture and Propagation.—These require sunny sheltered chinks of the rockery in rich sandy loam and peat. It may be increased by pegging down the runners and covering with rich soil to induce the formation of roots. In wet winters a sheet of glass may be placed over the plant to prevent wet lodging in the hairy rosettes.

A. septentrionalis (*A. coronopifolia*). A charming Russian biennial with flattish rosettes of smooth, lance-shaped, distantly toothed leaves. Flowers from April to June, pure white, on umbels borne on stalks about 4–6 in. high.

Culture &c. as above. In rich, free, sandy loam and peat in the rockery this species flourishes, and sows its seeds freely. The new seedlings replace the old plants naturally.

A. villosa (*A. penicillata*).—A pretty alpine and Pyrenean species 2–4 in. high with dense rosettes of narrow oblong leaves covered with a soft whitish down chiefly on the under surface. Flowers in May, rose or blush, about ¼ in. across, with a deeper coloured centre, and a honey-like perfume.

Culture &c. as above. Between pieces of limestone in sandy loam in the rockery. When established the flowers are produced in great profusion.

A. wulfeniana.—A rare dwarf free-growing Austrian species about 2 in. high, forming dense rigid tufts or rosettes of deep green oval pointed leaves. Flowers in summer, large, vivid rose or purple-crimson. There is a variety called *Pacheri*.

Culture &c. as above. Deep sandy loam and peat in the rockery.

DOUGLASIA.—A genus containing a few species of tufted or cushion-like smooth or hoary herbs with imbricated, clustered and spreading leaves, awl-shaped or oblong-lance-shaped, entire. Flowers at the ends of the branches or axillary, solitary and sessile or stalked, sometimes clustered in sessile umbels, yellow or red. Calyx bell-shaped 5-cleft to the middle. Corolla hypogynous, salver-shaped, constricted at the throat, and having 5 obovate oblong blunt imbricated lobes. Stamens 5 attached to the throat of the corolla. Ovary superior.

Culture and Propagation.—Douglasias being so closely allied to the Androsaces and having the same habit of growth may receive the same treatment in the rockery. A deep rich sandy soil composed of loam, peat, and leaf mould will suit them, and they may be propped up with pieces of stone so as to drain the water from them. A fresh stock of plants may be increased by carefully dividing the tufts in early autumn or in spring. Seeds may also be sown when ripe in cold frames, in which the young plants may be grown on in pots until sturdy enough for the open air.

D. lævigata.—A tufted perennial native of the Oregon Mountains, with rosettes of linear or oblong lance-shaped acute leaves ½–¾ in. long and more or less toothed on the margins. Flowers in spring and autumn, rosy-pink, ½–¾ in. across, 2–5 on stalks about 1–2 in. long.

Culture &c. as above.

D. nivalis.—A native of the Rocky Mountains with rigid hoary somewhat verticillate branches, and tufts of bluntly linear somewhat stem-clasping, hairy leaves. Flowers in April, pink, on long stalks.

Culture &c. as above.

D. vitaliana (*Androsace vitaliana; Gregoria vitaliana*).—A native of the Alps and Pyrenees 1–2 in. high, with linear, acute, greyish-looking leaves. Flowers from May to July, rather large, rich yellow, scarcely rising above the leaves.

Culture &c. as above. Moist yet well-drained sandy loam in sunny parts of the rockery between pieces of limestone or sandstone. Increased by seed or careful division.

CORTUSA (Bear's-Ear Sanicle).—A genus containing one or two species of downy scapigerous herbs with perennial rootstocks. Leaves long-stalked, roundish, heart-shaped obtuse, 7–9-lobed, toothed. Scape slender with flowers in umbels. Calyx bell-shaped, deeply 5-lobed. Corolla hypogynous funnel- or bell-shaped; tube short, throat naked; lobes 5, spreading, obtuse, imbricate. Stamens 5, attached to the base of the corolla. Ovary superior, free, ovoid. Capsule ovoid, many-seeded.

C. Matthioli.—A pretty Swiss alpine perennial resembling *Primula cortusoides* in the foliage by means of the roundish, irregularly toothed and lobed leaves. Flowers in early summer, deep purple-crimson, on stems 9–15 in. high, drooping, in loose umbels. The variety *grandiflora* from Siberia is a more vigorous plant with larger leaves and flowers.

Culture and Propagation.—Cortusas flourish in moist sandy loam and peat, in shady and rather sheltered spots in the rockery or border. They may be raised from seeds sown in a cold frame, as soon as ripe, or in spring; and may also be increased by carefully dividing the roots in spring or early autumn. Plants raised from seed are on the whole more satisfactory than the divided portions, and as the seeds germinate freely there is little trouble in securing a large number of plants by this means. It is safer to winter seedlings in cold frames and plant them out in mild weather in spring.

C. pubens.—A native of Transylvania and smaller than *C. Matthioli.* Leaves stalked and covered with a short silky down. Flowers in May and June, drooping, magenta-purple on slender stalks, 4–6 in. high.

Culture &c. as above for *C. Matthioli.*

SOLDANELLA (Moonwort). — A genus containing 3 or 4 species of pretty smooth scapigerous herbs with a short perennial rootstock. Leaves long-stalked, fleshy, roundish heart-shaped or kidney-shaped, entire. Scapes slender, solitary or few, one or more flowered. Flowers nodding, blue, violet, or rose, rarely white. Calyx 5-parted, with persistent lance-shaped segments. Corolla hypogynous funnel- or bell-shaped, with 5 lobes, each cut into several linear segments. Ovary free, ovoid. Capsule conically oblong, with a long beaked lid.

Culture and Propagation. — These charming little plants flourish in moist sandy loam and peat in parts of the rock garden where they will not be overcrowded by larger plants. They may be increased by seeds sown in sandy peat in spring, or in autumn and kept in a cold frame until spring. The plants may also be carefully divided in early autumn or spring. By growing in pots in cold frames, the plants will flower earlier than those grown outside, but they are apt to become starved and miserable under pot culture, and less able to stand dividing.

S. alpina (*Blue Moonwort*).—A graceful Tyrolese and Swiss alpine, 2–4 in. high, with roundish kidney-shaped entire leathery leaves and reddish downy stems. Flowers in April, nodding, violet or vivid blue, bell-shaped, with 5 finely fringed reflexed lobes. The variety *Wheeleri* is more free-flowering than the type.

Culture &c. as above.

S. minima.—A tiny native of the Swiss, Tyrolese, and Carinthian Alps, less than 2 in. high, with downy stems and roundish leaves. Flowers in April, solitary, dark lilac, streaked with lilac inside.

Culture &c. as above.

S. montana.—A native of the Pyrenees, about 3 in. high, resembling *S. alpina*, but larger in all its parts. Leaves almost round, loosely and remotely crenate. Flowers in April, purple, cut to the middle, 2–4 on a scape, with somewhat downy pedicels.

Culture &c. as above.

S. pusilla (*S. Clusi*). — A beautiful alpine about 2 in. high, native of the Dauphiny Alps and Pyrenees. Leaves heart-shaped reniform, slightly wavy on the margins. Flowers in April, blue or deep mauve, bell-shaped, with a prettily notched edge, one, rarely two on a scape.

A natural hybrid between this species and *S. alpina* has been noted.

Culture &c. as above.

DODECATHEON (American Cowslip; Shooting Stars).—A genus containing a few species of very smooth scapigerous herbs with a short perennial rootstock. Leaves ovate or oblong, blunt, entire, or sinuate-crenate, with a broad stalk. Scapes elongated, solitary. Flowers in umbels, slenderly stalked, nodding, white, rose, or purple, lobes sometimes laciniated. Calyx deeply 5-lobed. Corolla hypogynous, with a very short tube, thickened at the throat; limb with 5 reflexed, imbricated segments. Stamens 5, attached to the throat of the corolla;

filaments united in a tube. Ovary superior, free, ovoid or roundish. Capsule many-seeded.

Culture and Propagation.—The American Cowslips require light loamy soil and cool situations, the latter being a more important condition than the soil, which is equally suitable if leaf-mould or peat. They are well adapted for the decoration of cool shady parts of the rockery or border, and may be easily raised from seed sown as soon as ripe in cold frames, or even in the open border in the mildest parts of the kingdom. It is more usual, however, when a large number of plants are not required, to increase the stock by dividing the roots. The latter operation is best done in early spring just as growth is about to begin.

D. Hendersoni.—A pretty dwarf North American perennial about 6 in. high, with bright green leaves, and handsome crimson flowers with a conspicuous yellow ring at the base. The blossoms appear in March and April, and are thus among the first of the American Cowslips to bloom.

Culture &c. as above.

D. integrifolium.—A pretty N. American perennial 4–6 in. high, with oval or spoon-shaped entire leaves. Flowers in early summer, deep rosy-crimson, white at the base, with a yellow or dark orange throat, 7–8 flowers in an umbel.

Culture &c. as above. This is an excellent rock plant, and when grown in favourable situations ripens seeds freely. These may be sown when ripe to secure an increase, or the plants may be divided.

D. jeffreyanum.—This native of the Rocky Mountains is sometimes called *D. Meadia lancifolium*, but is distinct enough for garden purposes. It is larger than *D. Meadia*. Leaves 4–10 in. or more long, narrowly spoon-shaped, tapering towards the base, and recognised by its thick reddish midribs. Flowers purple-rose, with 4 petals, yellow towards the base.

Culture &c. as above. A hybrid called *D. Lemoinei* has been raised between this plant and *D. integrifolium.*

D. Meadia.—A beautiful N. American perennial 9-18 in. high, with more or less erect leaves in large tufts, oblong obovate, unevenly toothed, 3–7 in. long. Flowers in April, rosy-purple, white, or lilac, with yellow anthers, drooping in elegant umbels on tall scapes 12–15 in. high.

There are many fine varieties, among which may be mentioned: *album*, which differs from the type only in having white flowers, with a yellowish-green base; *elegans*, leaves shorter and broader, and roundly toothed, flowers deeper in colour and more numerous; *frigidum*, a very pretty dwarf variety with ovate, spreading, irregularly notched leaves about 3 in. long, and deep reddish-purple flowers, not drooping; *giganteum* (or *macrocarpum*), larger than the type in all its parts, and producing its flowers about a fortnight earlier; *lilacinum*, with lilac flowers; *brevifolium*, with roundish obovate or spoon-shaped leaves ½–2 in. long; and others not so well known.

Culture &c. as above. This—the Common American Cowslip—is the best known, and when grown in large masses in moist shaded positions and in good soil, it produces flowers very freely, usually 8–12 in an umbel, but sometimes nearly as many more in some forms.

CYCLAMEN (Sowbread).—A genus of distinct and beautiful dwarf scapigerous herbs with large, roundish, depressed, fleshy tubers or corms. Leaves long-stalked, ovate heart-shaped or kidney-shaped, entire or sinuate, dentate. Scapes slender, 1-flowered. Flowers nodding, white, rose, or purple, with the scape often spirally twisted after flowering, and pressing the seed-capsule into the ground. Calyx 5-parted, with persistent ovate or ovate lance-shaped segments. Corolla hypogynous, with a small roundish tube thickened at the throat; lobes 5, twisted, reflexed. Stamens 5, attached to the corolla at the base of the tube. Ovary superior, ovoid. Capsule globose or ovoid, many-seeded.

Culture and Propagation.—Hardy Cyclamens in their native homes are found growing among rocks on sloping banks under the shade and shelter of trees, on chalky porous soil, or on dry sandy places, always in such a position that the corms or tubers, which are more or less out of the ground, will not lie in pools of water. The soil is usually covered with moss, dry leaves &c., thus giving protection from frost in winter, and preventing excessive evaporation in summer. Under somewhat similar conditions may hardy Cyclamens be successfully cultivated in the British Islands, either in the rock garden or under trees in grassy places by woodland walks &c., where there is a free circulation of air. Where the natural conditions cannot be secured, they should be imitated as closely as possible by selecting a northern or north-west aspect, and making banks or slopes of well-drained soil consisting of rich sandy loam with a little peat or leaf-soil and a little mortar rubbish or pieces of limestone added. If there are no overhanging trees to give protection in severe winters, a covering of dry leaves will be sufficient as a rule.

The best time for planting the corms is when they are at rest, say from June to November, according as they flower in the autumn or spring. To make doubly sure as to drainage, sand may be placed beneath and around the corms, the tops of which should not be lower than the surface of the soil. Each winter the soil around the plants may have a mulching or covering of leaves, or the old manure from a spent mushroom bed. This will serve the double purpose of manuring and keeping the frost away from the corms.

The best and most natural method of increasing hardy Cyclamens is from seed. When fresh and thoroughly ripe they sprout in a few weeks in light sandy soil in a cold frame, or quicker in gentle heat. Where the plants flourish seedlings of the more vigorous kinds will often appear naturally. The first year it is better to grow the plants on in pots, and winter them in cold frames, after which they may be planted out the following season to establish themselves in their permanent quarters.

The corms may also be cut into pieces, each piece having at least one 'eye' or bud in it. The leaves with a small portion of the corm attached may also be inserted as cuttings in sandy peat under a bell-glass, and kept close and moist until rooted. These methods of propagation, however, are scarcely worth while, except when any particular species or variety cannot be raised from seeds.

The beautiful and well-known Persian Cyclamen (*C. persicum*) grown so much for greenhouse and conservatory decoration requires somewhat different and special treatment to bring it to perfection.

Although not a large group, there are few genera which exhibit so much confusion in regard to naming as Cyclamens. Being confined for the most part to Central Europe, the Mediterranean region, and W. Asia, this is the more remarkable, and the only conclusion to arrive at is that the same species varies a good deal according to its geographical position. The following list will be found to contain those best known in cultivation.

C. africanum (*C. autumnale; C. robustum*).—Found plentifully in the sandy oak woods of Algeria and Tunis, and closely allied to *C. neapolitanum*. Corms 4–8 in. in diameter, black, flat, irregular, producing roots from all parts. Leaves 6–8 in. broad and long, ovate or sinuate, serrate, sometimes angled, beautifully marbled with white above, purplish beneath, on stalks 8-12 in. long. Flowers in October and November, 1 in. or more long, sweet-scented, pale or deep rose, with a purple spot at the base of each auricled petal. White-flowered forms occasionally appear.

Culture &c. as above. If grown in the open this species may require slight protection with dry leaves in severe winters in northern parts of the country.

C. alpinum. —A dwarf plant closely allied to *C. Coum*, recently discovered at high elevations on Mt. Taurus in Asia Minor. Leaves faintly marbled. Flowers pink in the type, but white forms also exist.

Culture &c. as above.

C. Atkinsi (*C. hybridum*).—A hybrid between *C. Coum* and *C. ibericum*, and closely resembling the latter, but with larger leaves, sometimes slightly marbled with white above. Flowers in spring, white, rose, lilac, red, purple &c.

Culture &c. as above.

C. cilicicum.—A pretty species about 4 in. high, native of the Cilician mountains and the pine forests of Asia Minor. Leaves roundish, entire, with close basal lobes, purple beneath, developed with the flowers. Flowers from September to November, pale rose or pure white, strongly scented; petals lance-shaped lobed at the base and blotched with purple.

Culture &c. as above.

C. Coum (*C. caucasicum; C. elegans; C. hyemale; C. vernale &c.*)—A native of the Caucasus, Asia Minor, Greece, Turkey &c., and growing only about 3 in. high. Corm small, roundish, or flattened, 1-2 in. in diameter. Leaves contemporary with the flowers, roundish, slightly serrate or entire, dark green above, never marbled, deep purple beneath. Flowers from December to March, small, deep purple, scentless, petals not auricled at the base. There is a white variety *album*, and a rosy-red one, *carneum*.

Culture &c. as above. A very hardy plant.

C. cyprium (*C. cyprinum*).—A native of Cyprus closely related to *C. neapolitanum*, from which it differs chiefly in having unlobed leaves, and longer and narrower petals. Corm usually round. Flowers white with a purple spot at the base of each auricled segment.

Culture &c. as above.

C. europæum (*C. æstivum ; C. cordifolium ; C. odoratum &c.*) — *Common European Sowbread.*—A native of the mountains of Central and S. Europe, with regular, roundish, depressed corms and masses of dense, green, compact leaves, which are produced at the same time as the flowers, and ovate roundish in shape, deeply heart-shaped at the base, marbled with white above, deep purple beneath, on stalks 5–6 in. long. Flowers from June to October, purple-red, darker at the base, fragrant. There are several varieties, such as *album*, *Clusi*, *littorale*, *peakianum*, and *colchicum*; the latter from Asia Minor has a large corm, more regularly serrate leaves, and blunter petals. *C. tauricum*, having large leaves marbled with silver-grey, is probably only another form of this species; *C. colchicum* differs from the typical *C. europæum* in having larger corms and leaves, and wider and blunter petals.

Culture &c. as above.

C. græcum (*C. latifolium*).—A native of S.E. Europe and N. Persia, with large red tubers often irregular in shape. Leaves usually not developed till after the flowers, roundish heart-shaped, slightly and irregularly toothed, slightly marbled above, green, or faintly tinged with purple beneath. Flowers in September and October, light or deep lilac, rarely white, with a purple blotch at the base of each petal, variable in size, and faintly scented.

Culture &c. as above.

C. ibericum.—A native of the Caucasus about 3 in. high, with a roundish corm. Leaves contemporary with the flowers, roundish ovate, blunt, entire, or slightly waved on the margin, distinctly zoned with white. Flowers in February and March, bright red or purple in the type, varying from white to pale and deep rose, scentless, sometimes with a purple blotch at the base of the petals.

Culture &c. as above.

C. libanoticum.—A new species found growing with *C. persicum* and *C. ibericum* near Mt. Lebanon at an altitude of 2000–3000 ft. Corms often rough and scaly, the roots proceeding from the sides of the base. Leaves heart-shaped, entire, slightly wavy on the margin with a silvery-white zone above, dark violet beneath. Flowers in April, large, sweetly scented, bright or pale rose with a deep carmine blotch at the base of each petal.

Culture &c. as above.

C. neapolitanum (*C. ficariifolium ; C. hederæfolium &c.*).—A native of Southern Europe, with flattened, depressed and irregular corms, sometimes reaching a diameter of a foot, with root fibres, produced all over the surface. Leaves developed before the flowers appear, heart-shaped ovate, 3–4 in. long and broad, beautifully marbled with white above, purplish beneath. Flowers from August to October, rosy in the type, varying from red to white, slightly fragrant, spotted with purple at the base. There is a white-flowered form called *album*.

Culture &c. as above.

C. repandum (*C. balearicum ; C. hederæfolium ; C. immaculatum ; C. romanum &c.*). — A native of S. Europe, plentiful in Central Italy and the Corsican mountains at elevations from 4000 to 6000 ft. Corm small, roundish at first, depressed when old, producing roots from the base only. Leaves contemporary with the flowers, ovate-deltoid, heart-shaped at the base with an open sinus, beautifully marbled with white above, purple beneath. Flowers from March to May, fragrant, rosy-white, spotted with purple at the base.

Culture &c. as above. On good healthy corms in rich soil a large number of flowers will be produced—200 to 300 has been recorded.

LYSIMACHIA (LOOSESTRIFE). — A genus containing about 60 species of erect or creeping, slender or robust, smooth or downy, often glandularly punctate herbs. Leaves opposite, alternate, or whorled, sessile or stalked, entire. Flowers axillary or terminal, solitary, racemose, or in simple corymbose umbels, or panicled racemes, white, yellow, or rosy, rarely purple or blue. Calyx 5–6-parted. Corolla hypogynous, funnel-shaped or rotate, 5-parted, with a short or very short tube; lobes 5–6, erect or spreading, entire or toothed, twisted. Stamens 5–6, attached to the corolla tube, sometimes alternating with a like number of staminodes; filaments downy or naked, free or united. Ovary superior, round or ovoid. Capsule few- or many-seeded.

Culture and Propagation. — Lysimachias are usually easily grown in ordinary garden soil, preferring moist situations, some enjoying the edges of ponds or streams, but most of them useful for the flower border. They may be increased by division in autumn or early spring, or by seeds. The latter may be sown when ripe in cold frames, or in warm and sheltered parts of the garden, not scorched by the sun, and the seedlings may be transplanted the following spring. Increase by division, however, is so easy with most of the kinds that it is scarcely necessary to raise such from seed unless large numbers of plants are required.

L. atropurpurea (*Lubinia atropurpurea*).—An erect-growing species about 2 ft. high, native of S. Europe, with smooth fleshy obovate leaves. Flowers in summer, deep dark purple, in elegantly drooping racemes.

Culture &c. as above.

L. barystachys.—A pretty erect growing Chinese species with lance-shaped leaves. Flowers in summer, white, small, in dense erect crowded racemes.

Culture &c. as above.

L. ciliata.—A N. American species 2–3 ft. high. Leaves lance-shaped ovate, 3–6 in. long, tapering to a sharp point, rounded or lobed at the base, all on long fringed stalks. Flowers in July, light yellow.

Culture &c. as above.

L. clethroides.—A graceful Japanese plant 2–3 ft. high, with lower leaves spoon-shaped, upper ones broadly lance-shaped, 3–5 in. long, smooth, shining, entire. Flowers from July to September, white, about ½ in. across, star-shaped, crowded on dense pyramidal spikes about 1 ft. long, nodding at the top. Increased by division or seeds.

Culture &c. as above.

L. Ephemerum.—A pretty S. European species 2–3 ft. high, with smooth linear lance-shaped, entire, unstalked leaves of a sea-green colour. Flowers in summer, white, rotate in upright racemes. Stamens projecting.

Culture &c. as above. Deep light soil with eastern or western aspect. Increased by division in spring, or by seeds sown as soon as ripe.

L. lanceolata.—A N. American plant 1–1½ ft. high, with smooth linear or oblong-lance-shaped leaves. Flowers in early summer, yellow, solitary, in the axils of the leaves, or drooping stalks. Petals slightly notched. *Angustifolia* is a graceful variety, having long linear dotted leaves, and a more branching habit; *hybrida* is another form with broader foliage than the type.

Culture &c. as above. Sandy loam in the border. Increased by division.

L. Leschenaulti. — A distinct tufted branching Indian species about 1 ft. high, with lance-shaped acute leaves, sometimes opposite or ternate, sometimes alternate. Flowers in late autumn, brilliant carmine.

Culture &c. as above. This species is rather too tender for outdoor culture except in the very mildest parts of the S. coast, where it may be placed in bright sunny and sheltered parts of the rockery in rich moist soil.

L. nemorum (*Yellow Pimpernel*).—A pretty trailing British plant with slender stems 3–12 in. long, and shortly stalked ovate acute leaves 1–2 in. long. Flowers from May to July, rotate, yellow, slightly toothed, solitary.

Culture &c. as above. Suitable for the rockery or for rambling over banks. It likes sandy loam and peat with leaf mould and a northern or western aspect. Increased like *L. Nummularia.*

L. Nummularia (*Creeping Jenny; Moneywort*). — Although a native of England—but not Scotland or Ireland—being found in moist shaded places, the common Creeping Jenny is the best known and most generally cultivated species of the genus. It is a handsome creeping perennial with slender graceful 4-angled stems 2–3 ft. or more long, closely covered with opposite bright shining green roundish and somewhat wrinkled leaves. Flowers in June and July and later, 1 in. or so across, bright-golden shining yellow, solitary in the axils of the leaves, with broad sepals. There is a variety with soft yellow leaves called *aurea*.

Culture and Propagation.—For creeping and trailing over rocks, down banks, over old tree stumps, or for hanging baskets, the Creeping Jenny is a most useful and ornamental plant. It grows in ordinary soil, but prefers rather moist and partially shaded situations to become luxuriant in growth. It rarely ripens any seeds, so that it must be increased by other means. The easiest way is to divide the tufts in early autumn or in spring, planting them out in good soil. The long shoots may also be made into cuttings 2–4 in. long, and inserted in a moist shady border where they will soon root. The stems even thrown down on moist soil will give forth new plants without any trouble.

This species is grown extensively for market in pots. In spring the established plants are taken up and potted in rich sandy loam and leaf soil, and put in a cold frame till they recover from the shock of moving. They are then taken into a greenhouse, the gentle warmth of which, and plenty of water, induces long trailing growths and a profusion of early flowers almost the entire length of the stems. They are then fit for market, and are chiefly used for trailing over the sides of window boxes, hanging in porches, and in cottagers' windows.

L. paridiformis.—A distinct and interesting Chinese species 1–1½ ft. high, having bright red stems, furnished with 3 or 4 pairs of opposite scales instead of leaves. The true leaves are elliptic in shape and tapering at each end. They are borne in opposite pairs, but these are so close together as to suggest a whorl of four leaves as seen in *Paris quadrifolia* (p. 880). They are yellowish-green when young, but become tinged with purple as they grow older. The bright yellow flowers, with a deeper coloured centre, resemble those of *L. vulgaris*, and are freely borne in August in the axils of the leaves.

Culture &c. as above. It makes a good rock plant and may be increased by division after flowering, or by seeds sown as soon as ripe if obtainable.

L. punctata (*L. verticillata*).—A native of Europe and W. Asia about 1 ft. high, with stalked oblong lance-shaped leaves in whorls. Flowers in July and August, yellow, with ovate acute petals.

Culture &c. as above. Moist places by the edges of ponds, streams &c.

L. thyrsiflora (*L. capitata; Naumburgia thyrsiflora*).—A pretty British species found in marshes, the sides of streams &c. It grows 1–3 ft. high, and has opposite, sessile lance-shaped leaves 2–3 in. long, covered with black dots and rather crowded at the top of the stem. Flowers in June and July, yellow, in dense erect racemes springing from the leaf axils.

Culture &c. as above. Edges of streams, ponds, or marshy places.

L. vulgaris (*Common* or *Yellow Loosestrife*). — A pretty British plant with a creeping stolon-bearing rootstock. Stems 2–4 ft. high, with sessile leaves 2–4 in. long, opposite and whorled, ovate lance-shaped, with black glands. Flowers in July and August, dimorphic, rather bell-shaped, ½ in. across, yellow, with orange dots inside, in short panicled cymes in the axils of the upper leaves. A rare plant known as *L. dahurica* from Dahuria and Manchuria is closely related to the Common Loosestrife. It does not, however, produce runners, and flowers later and longer than that species.

Culture &c. as above. May be used with advantage on the edges of ponds, streams &c., or in the wild garden in moist soil. Increased by dividing the roots after flowering.

TRIENTALIS (Star Flower).—A genus with 2 species of very smooth herbs with a slender creeping perennial rootstock, and slender, solitary, erect stems. Leaves often equal in number to the petals, somewhat whorled, obovate-elliptic or lance-shaped, entire. Peduncles 1–3, one-flowered, thread-like. Flowers white. Calyx 5–9-parted with linear lance-shaped, spreading segments. Corolla hypogynous, rotate, 5–9-parted with a very short tube, and elliptic, lance-shaped, entire, twisted segments. Stamens 5–9. Ovary superior, free, globose. Capsule many-seeded.

Culture and Propagation. — These charming little plants like shady situations and light rich soil. They may be increased by dividing the roots in spring or autumn. Seeds may also be sown in cold frames in shallow pans or boxes under glass, when ripe, or in spring, afterwards transferring the seedlings to the open ground when large enough.

T. americana. — A native of N.W. America, about 9 in. high, with stems naked below but having 5–9 unequal leaves at the top, lance-shaped, pointed at both ends. Flowers in May, white, star-shaped, the radiating petals being sharply pointed.

Culture &c. as above.

T. europæa (*Chickweed Winter Green*).—A graceful British plant 4–9 in. high, with slender wiry stems, leafy at the top. Leaves 1½–3 in. long, shining, rigid, obovate or lance-shaped, narrowed into short stalks. Flowers in June and July, white, ½–¾ in. across, starry, on thread-like stalks.

Culture &c. as above. This species flourishes in peaty borders among Ericaceous plants, or the lower parts of the rock garden among mossy rocks.

GLAUX (SEA MILKWORT).—A genus containing only the following species:—

G. maritima. — A pretty and rather fleshy herbaceous perennial, native of the sea shores and river mouths of Britain and the North temperate hemisphere generally. It grows 3–6 in. high, and has a creeping rootstock, and small opposite linear or somewhat spoon-shaped fleshy leaves less than 1 in. long. The small white or pink flowers appear in June and July and are borne in the axils of the leaves. There is no corolla, its place being taken by the coloured bell-shaped calyx which has obovate-oblong lobes. The 5 stamens are arranged at the base of the calyx around the free ovoid glandular ovary.

Culture and Propagation.—This little plant is suitable for moist or muddy places and may be grown on the edges of bogs in sandy soil. It may be increased by seeds sown in moist soil when ripe, where the plants are to grow.

ANAGALLIS (PIMPERNEL). — A genus containing about 12 species of usually very smooth annual, biennial, or perennial, erect, diffuse, or creeping herbs with roundish or 4-angled stems. Leaves opposite or ternately whorled, the upper ones rarely all alternate, sessile, or shortly stalked, entire. Flowers axillary, scarlet, blue, or rose. Calyx 5-parted. Corolla hypogynous, 5-parted, rotate or bell-shaped, with entire or blunt erose contorted segments. Stamens 5. Ovary superior, round. Capsule many-seeded, dehiscence circumscissile.

Culture and Propagation.—The annuals, biennials, and perennials may all be raised from seed sown in spring, the annuals where they are to bloom, the others in pans or boxes from which the seedlings can be transplanted later on. The perennials may also be increased by cuttings of the young shoots put in sandy soil under a handlight; or they may be divided in the autumn or spring.

Pimpernels flourish in ordinary garden soil and may be effectively used in masses in the border, and as edgings to flower-beds.

A. collina alba.—A pretty little perennial with short, erect crowded stems thickly set with small lance-shaped leaves. Flowers from April to June, white, with a yellow centre, freely produced.

Culture &c. as above for *A. linifolia.*

A. fruticosa.—A pretty annual or biennial about 2 ft. high, native of Morocco, with 4 oval, lance-shaped leaves in a whorl. Flowers from May to August, large, vermilion, with a deeper centre, solitary, on slender axillary stalks.

Culture &c. as above. Raised from seeds sown annually.

A. grandiflora.—A compact free-flowering annual 4–6 in. high. Flowers from May to September, variable in colour, but deep blue and vermilion-red predominate. There are several varieties, the best known being *carnea* and *rosea.*

Culture &c. as above. Raised from seeds sown annually.

A. indica.—A trailing Indian annual about 1 ft. high, with small intense blue flowers in July.

Culture &c. as above. Raised from seeds sown annually.

A. linifolia (*A. Monelli*).—A beautiful Portuguese perennial 9–12 in. high, with opposite leaves. Flowers in July, about ½ in. across, brilliant blue. There are many varieties, the best being *Breweri* (or *Philipsi*), red; *Augenie*, blue, edged with white; *lilacina*, lilac flowers in May; *Napoleon III.*, crimson-maroon; *Parksi*, large, red; *phœnicea*, scarlet; *sanguinea*, blood-red; and *wilmoreana*, bright bluish-purple, with a yellow eye.

Culture &c. as above. Except on the south coast these plants require a little protection in winter. It is probably better to raise a fresh stock of plants every autumn from seeds, cuttings, or division, and winter in a cold frame.

A. tenella (*Bog Pimpernel*).—A pretty little British perennial having trailing 4-angled stems, and shortly stalked, broadly ovate or roundish leaves, opposite or nearly so. Flowers in July and August, bell-shaped, ½ in. across, rosy with dark veins, on rather stout stalks 1–2 in. long, very freely produced.

Culture &c. as above. This species may be increased by seeds or division, and should be grown in moist or boggy parts of the rock garden, or suspended in pots or pans half immersed in water.

A. webbiana.—A Portuguese perennial about 4 in. high, with several lance-shaped leaves in a whorl. Flowers from June to August, blue, with slightly toothed petals.

Culture &c. as above for *A. linifolia.*

CORIS.—This genus contains only one species:—

C. monspeliensis.—A pretty branching Thyme-like plant about 6 in. high, native of the Mediterranean region. Leaves alternate, linear, spreading or recurved, sinuate-toothed, clothing the stem from bottom to top. Flowers in summer, irregular, bright lilac, or rosy-purple, with orange anthers, shortly stalked or nearly sessile. Calyx tubular, bell-shaped, shortly 2-lipped, inflated at the base, 5-lobed. Corolla hypogynous, tubular, bell-shaped, somewhat 2-lipped, 5-lobed. Stamens 5. Ovary superior, free. Capsule globose, few-seeded.

Culture and Propagation.—Although a perennial, this species is usually best treated in British gardens as a biennial. Seeds may be sown as soon as ripe in cold frames, and the seedlings planted out in the following spring. They flourish in dry sunny parts of the rockery.

SAMOLUS (BROOKWEED).—A genus with about 8 species of smooth herbs sometimes shrubby at the base. Leaves alternate, lower ones sometimes in rosettes, linear oblong or spoon-shaped, entire. Flowers regular, white, in terminal racemes or corymbs. Calyx half-superior, 5-cleft, adnate to the base of the ovary. Corolla perigynous, rather bell-shaped, 5- lobed or parted, with roundish lobes. Stamens 5, attached to the corolla tube. Ovary more or less united to the calyx tube, free above. Capsule ovoid or globose, many-seeded.

S. repens (*S. littoralis*). — A pretty trailing perennial 6–12 in. high, native of Australia and New Zealand. Lower leaves stalked, ovate, or oblong, upper ones usually small, linear, or oblong. Flowers in August, pinky-white, freely produced. This species is sometimes known as *Sheffieldia repens.*

Culture and Propagation. — This is the only species generally met with. It flourishes in moist or boggy spots and is suitable for the rock garden in peaty soil. It may be increased by dividing the roots in spring.

S. Valerandi is a British species found in ditches and wet ground. It has obovate or spoon-shaped leaves and white flowers produced in racemes or corymbs from June to September. It is, however, scarcely worthy of notice from a cultural point of view.

LXIX. EBENACEÆ—Persimmon and Ebony Order

A natural order consisting of 6 genera and about 250 species of hard-wooded trees or shrubs with alternate, rarely opposite, entire, often leathery leaves without stipules. Flowers inconspicuous, regular, diœcious or rarely hermaphrodite or polygamous. Calyx inferior, gamosepalous, with 3–7 valvate, imbricate, or twisted lobes. Corolla gamopetalous, rotate, urn-shaped, bell-shaped, tubular or salver-shaped, 3–7-lobed. Stamens sometimes equal in number to the corolla lobes, sometimes twice as many or more, usually hypogynous. Ovary superior; styles 2–8. Fruit leathery or fleshy, usually indehiscent, one- or few-seeded.

DIOSPYROS (DATE PLUM). — A genus of trees or shrubs with alternate or rarely nearly opposite leaves. Flowers in axillary cymes, diœcious, rarely polygamous. Calyx and corolla 3–7- or 4–5-lobed. Stamens 4 or more, often 16.

Fruit globose, oblong, or conical, often pulpy.

D. coronaria.—A small Japanese tree, scarcely yet known in cultivation. It has large leathery leaves, and roundish orange-red fruits about an inch in diameter with persistent spreading or reflexed calyx lobes.
Culture &c. as for *D. Kaki.*

D. Kaki (*Date Plum*). — An ornamental Chinese tree 12–20 ft. high, with leathery, entire, ovate-elliptic, pointed leaves, downy on both sides, Flowers whitish-green, inconspicuous, succeeded by roundish yellow fruits, about the size of a small Orange, with a fleshy, edible, and rather agreeable pulp. The variety *costata* has ribbed fruits. There are other forms known as *aurantia*, *Berti*, *elliptica*, and *Sahuti gallica.* Closely related also is a Japanese shrub, *D. Wiseneri*, which has elongated ovate leaves rounded at the apex. The segments of the calyx have a short central lobe, and the slightly ribbed fruit is egg-shaped.
Culture and Propagation.—This tree is practically hardy in southern parts of England and Ireland. In northern parts it should have the protection of a south wall, although it will stand a little frost. It may be increased by seeds sown in gentle heat, and by cuttings of the ripened shoots inserted in sandy soil in brisk bottom heat. It likes good rich loam, and may be grown in large cool conservatories in unfavourable parts of the kingdom.

D. Lotus (*European Lotus* or *Common Date Plum*).—A native of S. Europe, Asia Minor &c., 20–30 ft. high. Leaves oblong-pointed, of a beautiful dark glossy green colour, becoming purplish beneath, and dropping off with the first sharp attack of frost. Flowers in July, reddish-white, small. Fruit about the size of a Cherry, yellow, with a sweet astringent flavour.
Culture &c. as for *D. Kaki.*

D. Mazeli. — A Japanese tree with elliptic-ovate or somewhat heart-shaped, deciduous leaves, and large orange-red fruits, ripe in November.
Culture &c. as for *D. Kaki.*

D. virginiana (*Persimmon ; Virginian Date Plum*).—An ornamental tree 20–30 ft. high, native of N. America. Leaves ovate-oblong, pointed, smooth, shining above, net-veined, with short curved downy stalks. Flowers in July, small, pale yellow. Fruits about the size and shape of an ordinary Plum, golden-yellow.
Culture &c. as for *D. Kaki.*

LXX. STYRACEÆ—Storax Order

A natural order of trees or shrubs with alternate, entire or serrate, membranous or leathery, penniveined leaves without stipules. Flowers regular, hermaphrodite or rarely polygamous-diœcious, often in simple terminal or axillary racemes. Calyx gamosepalous, free or adnate to the ovary, 5-lobed. Corolla with 5, rarely 4, petals, united at the base, rarely all free, usually white, rarely red. Stamens as many or twice as many as the corolla lobes, or many more. Ovary inferior, or half superior. Fruit often a drupe or berry, enclosed by the calyx-tube or inferior, 1-seeded by abortion.

SYMPLOCOS.—A rather large genus of smooth downy or hairy trees or shrubs with alternate, leathery, or membranous, toothed or entire leaves. The flowers are borne in loose or dense spikes or racemes in the leaf-axils, but are sometimes reduced to few-flowered fascicles or to single blossoms. Calyx bell-shaped, 5-lobed. Corolla lobes or segments 5 in one series, or 6–10 in two series, free, or more or less united. Stamens often numerous and in many series. Ovary inferior or half-superior, 2–5-celled. Fruit an oblong ovoid or roundish indehiscent fleshy berry or drupe.
Culture and Propagation. — These plants grow well in good garden soil which is well drained, fairly sandy and composed of loam, peat, or leaf soil. They cannot be regarded as hardy except perhaps in the very mildest parts of the south and west. In other localities they should have the protection of a south wall, and be more or less protected during severe winters according to locality. They may be increased by means of cuttings of the

ripened young shoots inserted in sandy soil under handlights in autumn; or by means of seeds which should be sown in cold frames as soon as ripe, if they can be obtained. Plants obtained from seeds ripened in the open air in our climate are more likely to stand the winter than those raised from imported seeds or from cuttings.

S. cratægoides.—This species is found from the Himalayas to Japan and in a wild state attains a height of 40 ft. It is only a dwarf shrub, however, in our climate with more or less elliptic lance-shaped leaves about 2½ in. long, and closely serrated on the margin near the apex. The small white Hawthorn-like flowers appear in April or May and are borne in panicles 3–6 in. long.

Culture &c. as above. This species ripens seeds fairly freely.

S. japonica (*S. lucida*). — A pretty Japanese tree or shrub, growing about 6–10 ft. high, with smooth oblanceolate leaves about 2 in. long, and serrated on the edges. The pale yellow almost stalkless flowers appear in June, in short racemes in the axils of the leaves.

Culture &c. as above.

S. tinctoria (*Horse Sugar; Sweet Leaf*). — This shrub is a native of the Southern United States, and grows in our climate 3–6 ft. high. It has oblong lance-shaped thickish and somewhat downy leaves, 3–5 in. long, obscurely toothed on the margins. The sweet-scented yellow flowers, 6–14 in a cluster, appear in April.

Culture &c. as above. The leaves of this species when dry assume a yellow colour and are used for dyeing. In a green state they are sweetly flavoured and much eaten by cattle.

HALESIA (SILVER BELL or SNOWDROP TREE). — A genus of deciduous shrubs or small trees, with alternate membranous entire or finely toothed leaves. Flowers white, showy, drooping on slender stalks, in clusters or short racemes from the axils of the fallen leaves of the preceding year, sometimes from the ends of branches of the current year. Calyx tube adnate to the ovary, 4–5- or 10-ribbed, 5- lobed or toothed. Petals or corolla lobes 4 or 5, very slightly united at the base or almost free, erect, spreading. Stamens 8, 10, or 12, almost free from the petals, or united in a ring at the base of the corolla. Ovary mostly inferior, 3–5-celled. Drupe rather dry, long-beaked, crowned with the calyx-teeth, 4–5-winged, containing by abortion 1–3 seeds.

Culture and Propagation.—Halesias flourish in deep sandy moist soil, and form ornamental objects on the lawn or in the shrubbery. They may be raised from seeds sown in gentle heat in spring; by layers made during the autumn; or by cuttings of the roots inserted in sandy soil with bottom heat in early spring.

Although not yet very well known in private gardens the Halesias or Snowdrop trees deserve to be grown in all large gardens where spring-flowering trees and shrubs are admired. During the winter months the soil may be given a top dressing of well-decayed manure.

H. corymbosa (*Pterostyrax corymbosum*).—A Japanese tree 10–12 ft. high, with hairy, ovate, abruptly pointed, sharply serrate leaves. Flowers in June, white, tinted with red or yellow, in corymbose panicles.

Culture &c. as above.

H. diptera (*H. reticulata*). — A North American tree about 10 ft. high, with large ovate acute serrate leaves. Flowers in May and June, white, rather larger than those of *H. tetraptera*, and with longer and more acute petals. Fruits with 2 large opposite wings, hence the specific name.

Culture &c. as above.

H. hispida (*Pterostyrax hispidum*). A pretty Japanese tree or shrub, with large heart-shaped leaves on stout stalks. Flowers in early summer, white, freely produced in corymbose racemes, succeeded by fruits densely covered with stiff hairs.

Culture &c. as above.

H. parviflora.—A shrub about 10 ft. high, native of Georgia and Florida. Leaves downy, ovate-oblong, acute, almost entire, glaucous beneath. Flowers in May, white, drooping, in panicled racemes. Fruit club-shaped, slightly 4-winged.

Culture &c. as above. Requires somewhat sheltered situations.

H. tetraptera (*Snowdrop Tree*). — A beautiful N. American tree, 15–20 ft. high or more, with ovate lance-shaped, pointed, sharply toothed leaves. Flowers in May, pure white, 9–10 in a drooping cluster, and very much resembling Snowdrops in shape and appearance, hence the popular name. Fruit 4-winged, 1–2 in. long. A splendid lawn tree, and also very effective by the side of ornamental pieces of water. The variety *Meehani* is a seedling form of the type, from which it differs in having thicker pale green and distinctly wrinkled leaves, and smaller flowers with shorter stalks.

Culture &c. as above.

STYRAX (STORAX).—A genus containing about 60 species of trees or shrubs, with all parts except the upper surface of the leaves more or less covered with scales or a stellate tomentum. Leaves entire or slightly serrate. Flowers in short, loose terminal or axillary racemes, often drooping and white. Calyx bell-shaped, minutely 5-toothed or almost entire. Petals or corolla segments 5, slightly united at the base, rarely as far as the middle, erect, spreading, elliptic oblong. Stamens 10, attached to the very base of the corolla, rarely adnate higher up. Ovary mostly superior. Fruit round or oblong, containing by abortion 1, or rarely 2 seeds.

Culture and Propagation. — The Styraxes when in bloom are very handsome like the Halesias, only being much dwarfer plants. They enjoy similar treatment to the Halesias, and flourish in deep rich and fairly moist loamy soil. For massing in beds by themselves on grass or in the shrubbery they are very effective. They may be increased in the same way as the Halesias. They are not yet well known, but are becoming more and more popular.

S. americanum. — A N. American shrub 4–8 ft. high. Leaves 1–3 in. long, bright green, oblong or oval, mostly entire and acute at both ends, pointed. Flowers in summer, white, nodding, solitary. or in few-flowered racemes. This plant was at one time called *Halesia parviflora*, and is figured as such in the 'Botanical Register' at t. 952. It must not, however, be confused with the true plant bearing that name and described above.

Culture &c. as above.

S. californicum.—A native of California, 5–8 ft. high. Leaves 1–2 in. long, shortly stalked, oval, entire or slightly wavy on the margins. Flowers white and deliciously fragrant, with a hoary calyx and corolla, and a style becoming about 1 in. long. Fruit about the size of a small Cherry, bony.

Culture &c. as above.

S. grandifolium. — A N. American shrub about 6 ft. high, with obovate acute or pointed leaves 3–6 in. long, hoary beneath. Flowers in spring, white, mostly in long racemes.

Culture &c. as above.

S. Obassia.—A pretty Japanese shrub with reddish branches, and broad rounded bright green leaves about 8 in. long and about as much across, with a narrow triangular tip, and numerous more or less well-defined teeth on the margins. Flowers in spring, white, in drooping racemes 6–8 in. long, the yellow stamens in the centre being very conspicuous against the 6 elliptic white petals.

Culture &c. as above.

S. officinale.—A native of the Levant, about 10 ft. high. Leaves about 2 in. long, oval-obovate, hoary beneath. Flowers in July, white, in short few-flowered racemes; corolla often 6–7-parted. The Storax of commerce is derived from this species.

Culture &c. as above.

S. pulverulentum.—A native of the S. United States, 1–4 ft. high. Leaves oval or obovate, about 1 in. long, slightly downy above, scaly beneath. Flowers in spring, white, ½ in. long, fragrant, 1–3 together in the axils of the upper leaves and the tips of the branches.

Culture &c. as above.

S. serrulatum.—A beautiful shrub or tree attaining a height of 40 ft. in its native state, extending from India to Japan. Leaves about 2½ in. long, oblong-pointed, serrulate. Flowers in spring, white, in short racemes; corolla 5–6-lobed, downy. The variety *virgatum* has tapering pointed leaves, broadest in the middle. The plant known as *S. japonicum* comes near this variety, and differs only in having pink-tinted buds.

Culture &c. as above. *S. serrulatum* and its varieties flourish in good soil in warm parts of the south of England and Ireland. They only attain the size of low bushes in cultivation.

LXXI. OLEACEÆ—Lilac and Olive Order

This order consists of erect or climbing, smooth or rarely downy, unarmed shrubs or trees, very rarely herbs. Leaves opposite, rarely alternate or whorled, simple or pinnately 3 or few foliolate, entire or toothed, without stipules. Flowers regular, hermaphrodite, rarely diœcious or polygamous, in loose or clustered forked cymes or trichotomous panicles. Calyx free, bell-shaped, usually 4-toothed or lobed, rarely more or none. Corolla gamopetalous, salver-shaped, funnel-like or bell-shaped; lobes or petals 4, rarely 5–6. Stamens 2, rarely 4, ovary superior 2-celled. Fruit a capsule, berry, or drupe.

JASMINUM (Jasmine; Jessamine). A genus of erect or climbing branched shrubs with opposite, rarely alternate, leaves, simply 3-foliolate or oddly pinnate. Flowers from the tips of the branches, or in forked cymes, or solitary from a pair of scales, often showy, white, yellow, or reddish outside. Calyx 4–9-toothed, lobed or parted. Corolla salver-shaped with a cylindrical tube sometimes widened above, 4–5- or more lobed. Stamens 2, inserted upon and enclosed within the corolla-tube. Ovary 2-celled. Fruit a somewhat 2-lobed succulent berry with 1 or few seeds.

Culture and Propagation.—Although 120 species have been described, only a few are hardy enough for outdoor cultivation in the British Islands, many of the others being beautiful greenhouse or stove climbers. The hardy varieties may be used in a number of ways, such as covering the sides of buildings, trained over arches or trellises, &c., to all of which they give a bright appearance when in bloom. They flourish in any fairly good garden soil, and some like the Winter Jasmine (*J. nudiflorum*) flower profusely in any poor soil. Jasmines may be increased by cuttings of the ripened wood in summer and early autumn inserted in sandy soil in a cold frame or under hand-lights, and kept shaded for some time from the sun. Where convenient, layers may also be made during the summer and autumn. Seeds may be sown as soon as ripe, and the young plants wintered in a cold frame until the following spring.

J. floridum.—An ornamental Chinese and Japanese shrub with alternate and pinnately 3-foliolate leaves. Flowers in summer, about ½ in. across, yellow, in loose cymes.

Culture &c. as above.

J. fruticans. — A beautiful evergreen 10–12 ft. high, native of S. Europe, with angular branches and simple ternate leaves composed of obovate, wedge-shaped, blunt leaflets. Flowers in summer, yellow, with oblong-blunt petals.

Culture &c. as above. This species may be grown as a bush supported by a stout stake or old tree stump in the centre.

J. humile.—A deciduous Indian shrub 3–4 ft. high, with angular branches, and acute trifoliolate or pinnate alternate leaves. Flowers in summer, yellow, with oblong blunt petals. Peduncles from the ends of the branches in twos or threes, each with 8 flowers.

Culture &c. as above.

J. nudiflorum (*Winter Jasmine*).—A free-growing and popular Chinese climber with green flexible stems, and small ternate leaves. Flowers from December to March or April, yellow, about 1 in. across, in opposite pairs along the stems.

Culture &c. as above. The great value of this beautiful climber consists in its winter flowering when the branches are quite free or naked from the absence of leaves. It is extremely hardy, and although severe frosts tarnish the yellow blossoms somewhat, fresh ones soon appear. The beauty of this plant is often marred by being pruned in autumn when the flowering shoots are almost fully developed to their full length. If cut back at this season the flower buds are destroyed and a scanty supply of blossom only obtained. The proper time to prune this species is just after the flowers have withered in March and April. The old wood should be cut away, leaving the younger shoots to develop twigs for flowering the following season.

J. odoratissimum.—A round-stemmed native of Madeira with alternate pinnately ternate bluntish leaves. Flowers in summer, yellow, with 5 oblong blunt lobes. Peduncles at the tips of the branches in threes, each one having 3 flowers.

Culture &c. as above. This Jasmine is not quite hardy in northern parts, but flourishes in the mild southern districts.

J. officinale (*Common White Jasmine*). A beautiful very hardy vigorous and free-growing climber found in a wild state from N. India to Persia. It has angular stems, and opposite pinnate leaves, with ovate pointed leaflets, the end one of which is longer and larger than the others. Flowers from June to September, ½–¾ in. across, pure white, fragrant, with 4–5 lobes to the corolla. The variety *affine* has larger and more numerous flowers than the type, and is probably a seedling of garden origin. The variety *aureum* is an undesirable form with yellow-blotched leaves; *grandiflorum* as known in gardens is practically the same as *affine*.

The White Jasmine is an evergreen except in the bleakest localities, where it loses its leaves. For covering walls, arches, pergolas, arbours &c. it is most valuable.

Culture &c. as above.

J. revolutum.—An evergreen Indian climber closely related to the deciduous *J. humile*. It has alternate pinnate leaves composed of 5–7 ovate lance-shaped or elliptic leaflets on short stalks. Flowers from May to October, bright yellow, very fragrant, in compound corymbs at the ends of the branches. Corolla with 5 blunt segments.

Culture &c. as above. Being somewhat tender, in northern parts it is better to give this species the protection of a wall. *J. pubigerum* is very near this species, but does not appear to be quite so hardy, nor has it flowers as large.

FORSYTHIA (Golden Bell). — A genus with 2 species of smooth shrubs resembling *Jasminum nudiflorum* in habit. Leaves opposite, rarely verticillate, entire, or pinnately 3-sected, serrate, deciduous. Flowers appearing before the foliage, solitary, from a pair of scales, nodding, shortly stalked, yellow. Calyx-tube short, roundish, with 4 longer lobes. Corolla tube short and broad, with 4 much longer lobes, spreading above. Stamens 2, attached to the base of the corolla. Ovary 2-celled. Capsule oblong, leathery or hard.

Culture and Propagation.—Forsythias are among the choicest of early spring-flowering hardy shrubs, and prolong the season of yellow-flowered climbers of which *Jasminum nudiflorum* is the forerunner. Indeed Forsythias may be trained against walls in a similar way to the Winter Jasmine, or they may also be grown as bushes in open sunny situations in beds by themselves or in open parts of the shrubbery.

When grown against a wall the shoots should have plenty of space between them, as crowding only interferes with the beautiful drooping blossoms. If thinning out is necessary, the twigs are best removed just after flowering in the same way as recommended for *Jasminum nudiflorum* above. Indeed to secure a grand display of blossom in spring it is almost necessary to cut the shoots back to 3 or 4 eyes or buds when the flowers are over. From each bud a vigorous shoot will spring and will have a long season to grow and fully ripen before winter. In the spring-time the flowers appear from almost every joint, and the shoots for their whole length are literally wreathed in yellow bells.

When the branches droop on to the soil roots are often emitted near the tips of the shoots forming natural layers. By this means it is easy to increase the number of plants. Cuttings of the green shoots may also be inserted in sandy soil under handlights during the summer and kept damp and shaded until rooted. In autumn the ripened shoots may also be made to root, and after wintering in cold frames will be ready for planting out in spring. Forsythias would probably be easy to graft on stocks of the Common Privet (*Ligustrum vulgare*) like many other plants in the Olive order, but it is preferable to have plants on their own roots, especially as they are so readily obtained.

F. intermedia. — This is a hybrid obtained by crossing *F. suspensa* and *F. viridissima*. It is intermediate in character between its parents and promises to become equally popular with them.

Culture &c. as above.

F. suspensa (*F. Fortunei; F. Sieboldi*).—A graceful Chinese and Japanese shrub with long twiggy branches bearing both simple and 3-foliolate toothed leaves, the central leaflet of which is about 6 times larger than the other two. Flowers in February and March, yellow, drooping, arranged along the stems for a considerable distance.

Culture &c. as above. May be grown as a bush or against a wall. Plants in pots are easily forced for greenhouse and conservatory decoration early in the year before the natural blooming period out of doors.

F. viridissima is a Japanese shrub about 10 ft. high, and is unsuitable for climbing up walls. Its leaves are all simple, entire, linear lance-shaped or oblong acute. The yellow flowers appear in March, in great profusion on very short stalks.

Culture &c. as above. To obtain the best results this species should be grown in spots where there is a free circulation of air and plenty of sunshine.

SYRINGA (Lilac; Pipe Tree).—A genus of well-known ornamental smooth or downy shrubs, with opposite, entire, or rarely pinnately-cut, deciduous leaves. Flowers in three-forked panicles or terminal clusters, the lower or outer ones open first, but sometimes the inner ones. Calyx bell-shaped, irregularly toothed. Corolla tube cylindrical, rarely shortened, with 4 lobes. Stamens 2, attached beneath the top of the tube. Ovary 2-celled. Capsule leathery.

Culture and Propagation. — From Easter to Whitsuntide the Lilacs are the finest and showiest flowering trees of the British landscape, the deep glossy green foliage often being almost hidden by the immense number of trusses of bloom, the individual blossoms of which are, comparatively speaking, very small. The plants thrive in almost any soil, but become luxuriant in deep rich loam. Unfortunately they are often neglected and allowed to become choked with suckers which shoot up in great numbers from the base. These should be removed every year, as they simply waylay a good deal of the nourishment which would be of more use to the main plant. If fresh plants are required the rooted suckers may be used, and planted out by themselves in autumn in a spare piece of ground until they become established and fit for transplanting to their permanent positions. Lilacs are often grafted or budded on the common Privet or common varieties, but after a few years many of them show signs of decay, and this practice is never to be recommended except when plants cannot be readily obtained otherwise. Cuttings of the half-ripened shoots inserted in sandy soil in summer under handlights or cold frames will root, if kept shaded and moist for a time. The ripened leafless wood may also be cut into lengths of 8–9 in. and inserted in the autumn 3 or 4 in. deep. In frosty weather they should be protected by having the soil covered with litter or short manure to prevent the ground cracking. Many of the beautiful varieties so much used for forcing early in the year have been raised from seeds, but are now grafted or budded on commoner stocks and extensively grown on the Continent, whence they are imported every year to this country. Many of them have the flowers artificially blanched by being grown in dark sheds or cellars from which light is excluded. The temperature is kept up to about 55° or 60° F. by means of stable litter, leaves &c., and the atmosphere is always kept fairly moist. As green leaves cannot form in the dark for reasons explained at p. 22, the flower trusses alone are produced, and used in a cut state with foliage from other plants exposed to the light, and gently forced in greenhouses.

When grown in large bold masses or beds in the outdoor garden, Lilacs make effective pictures on the landscape. The different varieties may be grouped together, or judiciously mixed, not only as regards height but also colour.

S. amurensis (*Ligustrina amurensis*). A handsome Chinese and Japanese shrub about 5 or 6 ft. high, with broadly ovate pointed leaves, rounded or wedge-shaped at the base, smooth above, midrib and veins downy beneath. Flowers in early summer, creamy white, in dense rounded trusses.

Culture &c. as above.

S. chinensis (*S. dubia; S. rothomagensis*).—This is known as the Chinese or Rouen Lilac, and is considered by some to be a hybrid between *S. persica* and *S. vulgaris*, having originated at Rouen. It is a shrub 4–6 ft. high, with small shining smooth ovate lance-shaped leaves, slightly acute at the base and pointed at the apex. Flowers in May and June, salver-shaped, intense violet.

Among its varieties may be mentioned *alba*, with almost pure white flowers; *metensis*, with pale lilac flowers; *rubra*, with very fine rosy-red flowers; and *saugeana*, with sweetly scented rosy-lilac ones.

Culture &c. as above.

S. Emodi. — A beautiful Himalayan shrub about 6 ft. high, with broadly elliptic or ovate leaves 3-4 in. long, on stalks ½–¾ in. long. Flowers in April, purplish or white, strongly scented, in dense panicles or clusters, the corolla having a rather long tube. The variety *variegata* has yellow-blotched leaves, and *rosea* or *villosa* differs from the type in having hairy instead of smooth foliage.

Culture &c. as above.

S. japonica. — A handsome Japanese Lilac. Closely related to *S. amurensis*, but distinguished from that species by its taller stature (in Japan it reaches a height of 80 ft.) and by the more pointed lobes of the corolla. The leaves are broadly ovate and of a deep shining green on the upper surface. The white slightly scented flowers appear in June and July, and are borne in large branched panicles a foot or more in length.

Culture &c. as above.

S. Josikæa. — A distinct Hungarian shrub 5-10 ft. high. Leaves smooth, elliptic lance-shaped, acute, wrinkled, slightly ciliate, deep shining green above, whitish beneath, on short stalks. Flowers in May, bluish-purple, with a slightly concave corolla limb, and borne in erect panicles at the ends of the shoots.

Culture &c. as above.

S. oblata. — A Chinese shrub readily distinguished by its large, rather fleshy, roundish heart-shaped leaves 1½–3 in. across. Flowers in May, purple, produced in great abundance. There is a white-flowered variety, *alba*, which is very rarely seen.

Culture &c. as above.

S. pekinensis (*Ligustrina pekinensis*). A bushy shrub or small tree from N. China, having slender, velvety, dark red branches, and opposite, ovate-elliptic leaves, with blackish-purple stalks and midribs. Flowers in early summer, white, borne in dense panicles. The variety *pendula* is distinguished by its drooping or 'weeping' habit.

Culture &c. as above.

S. persica (*Persian Lilac*). — A handsome shrub 4–7 ft. high, native of Afghanistan and but rarely found wild in Persia. It has smooth, shining, lance-shaped acute leaves 1–1½ in. long. Flowers in May and June, bluish-purple, or white as in the variety *alba*. The variety *laciniata* has almost all the leaves deeply cut into 3–5 or more narrow oblong lobes.

Culture &c. as above.

S. villosa.—A native of N. China 3–6 ft. high, having ovate or ovate elliptic bluntish leaves, smooth above, hairy on the principal nerves beneath. Flowers in May, bluish-purple or rosy-lilac, sweet-scented, with a slender corolla-tube and oblong reflexed lobes.

Culture &c. as above.

S. vulgaris. — This is the common 'Lilac' or 'Pipe tree.' It is a native of North Persia, and was first brought to Vienna, in the latter half of the sixteenth century, by the Flemish diplomatist Busbecq. From Vienna it soon spread all over Europe, and is now also largely cultivated in N. America. It grows from 8 to 20 ft. high, and has smooth, heart-shaped or ovate-cordate leaves, broader than those of *S. persica*. Flowers in May, lilac, purple, or white as in the variety *alba*, and borne in large conical trusses.

There are many fine varieties of the Common Lilac, with single and double flowers. Among the single-flowered varieties may be mentioned, *alba grandiflora*, *alba magna*, *alba virginalis*, *Marie Legrange*, all excellent whites, especially the last named. Among the single coloured varieties are *E. Lemoine*, *La Tour d'Auvergne*, *Leon Simon*, *Souvenir de L. Späth* (the deepest coloured variety with dark and brilliant crimson-purple flowers), *Virginité* (pale pink), *Charles X.*, *Louis Van Houtte*, *Dr. Lindley*, *Delphine* (reddish-violet), *Philemon* &c.

The double-flowering kinds include *Alphonse Lavallée*, *Le Gaulois*, *Lemoinei*, *Mathieu de Dombasle*, *Michel Buchner*, *Ranunculiflora*, *Renoncule*, *Rubella*, *Madame Lemoine*, and *President Grévy*—all coloured except *Madame*

Lemoine, which is a very fine double white.

Culture &c. as above.

FRAXINUS (Ash). — A genus of large or ornamental trees with deciduous, opposite, oddly pinnate, or very rarely undivided, often serrate leaves, and dense axillary clusters of polygamous or diœcious flowers. Calyx small, 4-lobed or absent. Petals none, or 2–4, free or united at the base in pairs. Stamens 2, attached to the base of the petals, or hypogynous. Ovary 2-celled. Fruit a samara or 'key,' winged at the tip and sides.

Culture and Propagation. — The Ashes prefer a rich loamy soil, but will flourish in any ordinary good soil, in situations where they will be sheltered from bleak winds. They are most suitable for large parks or pleasure grounds. Increase is usually by means of seeds, but many of the rarer kinds are grafted or budded on commoner stocks, and when done on the top of a tall standard, weeping varieties are obtained. The seeds ripen in the autumn, and are best kept mixed with sand until the following spring or even autumn, as they do not as a rule germinate the same year as they ripen. They should be sown in beds of good sandy loam, and after about two seasons the seedlings may be transplanted about 6 in. apart in rows not nearer than 18 in. to each other. Here they may remain for two years more, after which they will be fit for transplanting to their permanent quarters in the autumn or early spring during mild weather. The indigenous species reproduce themselves naturally from seeds, which are blown by the wind considerable distances from the parent tree. They germinate freely and grow vigorously in almost any soil.

There are about 50 species, but the following is a selection of some of the most ornamental. The Mountain Ash (*Pyrus Aucuparia*) and the Prickly Ash (*Zanthoxylum americanum*) belong to different orders, and are described at p. 405 and p. 296 respectively.

F. americana (*F. acuminata; F. alba; F. Curtisi; F. epiptera; F. juglandifolia*). — *White Ash.* — A splendid tree 30–40 ft. high, native of New Brunswick and Canada. It is readily distinguished from the Common English Ash (*F. excelsior*) by its lighter, brownish-grey bark and pale green leaves, which are composed of 2–4 pairs of ovate or ovate-pointed, shining serrate leaflets 3–5 in. long. Flowers in April and May, white, in terminal panicles. The variety *latifolia* has broader leaves than the typical White Ash.

F. pubescens (also known as *F. nigra*, *F. pennsylvanica*, and *F. tomentosa*), the *Red Ash* or *Black Ash*, is very similar, but is a smaller tree, with deep brown bark, leaves downy beneath, and greenish-yellow flowers.

Culture &c. as above. It thrives near the sides of lakes, ponds &c., or in moist soil.

F. excelsior.—A beautiful and highly ornamental shade tree 80–80 ft. high, or even more, native of the British Islands, Central and South Europe, and N. Asia. The leaves consist of 4–7 pairs of oblong lance-shaped serrate leaflets, 1–3 in. long. Flowers from March to May, polygamous, greenish-yellow, in dense small axillary panicles, with purple-black stamens.

Cultivation has produced and perpetuated a large number of distinct and handsome varieties, of which the 'Weeping Ash,' with branches drooping to the ground; the 'Curl-leaved Ash,' with deep green, wrinkled and curled leaves, are fairly well-known. There is also a variety (*simplicifolia* or *monophylla*) in which the leaves are entire instead of being divided into leaflets; and many others to be found in nurserymen's catalogues, such as *aurea*, *aurea pendula*, *crispa*, *foliis argenteis*, *horizontalis*, *heterophylla*, *lutea*, *monstrosa*, *myrtifolia*, *pendula*, *scolopendrifolia*, *spectabilis*, *viridis*, &c., the names of which give an idea of the peculiarities of the plant.

Culture &c. as above.

F. Ornus (*F. argentea; F. rotundifolia; Ornus europæa*).—*Flowering* or *Manna Ash.*—A handsome free-flowering tree 20–30 ft. high, native of S. Europe, resembling the Common Ash in appearance. It may be recognised by its young branches being purple or livid, and dotted with yellow, and lance-shaped or elliptic leaflets, stalked and serrated, and hairy or downy beneath. Flowers also later in May and June, greenish-white, in dense clusters, all over the tree. The variety *alba* has white flowers, with dark purple-brown stamens; *violacea* has flowers of a greyish-violet hue. These are both seedling forms, notable for the dwarfness and freedom of flowering.

There are several other species, such as *F. Mariesi* and *F. parvifolia*, not so well known in this country.

Culture &c. as above.

FONTANESIA.—A genus containing one or two species of ornamental Privet-like shrubs, with opposite entire leaves, and small flowers in axillary and terminal racemes or panicles. Calyx 4-toothed. Petals 4, free, or united about the middle. Stamens 2, attached to the base of the petals.

Culture and Propagation. — These plants are not very well known. They thrive in ordinary soil, and may be increased by layers and cuttings in the same way as the Forsythias (p. 637).

F. Fortunei. — A beautiful Chinese shrub 10–12 ft. high, with roughish bark, and lance-shaped, long pointed leaves, glossy green above, paler beneath. Flowers in summer, creamy yellow, in axillary and terminal panicles.

Culture &c. as above.

F. phillyræoides.—A Syrian shrub like the preceding in almost every way, and probably only a geographical variety of it.

Culture &c. as above.

PHILLYREA (Jasmine Box; Mock Privet).—This genus contains 4 species of ornamental, smooth, evergreen shrubs, with opposite, entire, or serrulate leaves. Flowers small, in axillary clusters. Calyx short, broadly 4-lobed. Corolla tube short, with 4 broad, blunt lobes. Stamens 2. Fruit, an ovoid or round, fleshy, 1-2-seeded drupe.

Culture and Propagation.—Phillyreas thrive in ordinary garden soil, but delight in a deep rich loam. They are splendid shrubbery plants, and always attract attention by their compact habit and beautiful deep green, leathery leaves. Cuttings of the ripened shoots may be struck in sandy soil in late summer and autumn under a handlight or cold frame, or the lower branches may be layered. They are often grafted low down on stocks of the Privet, but are as a rule much better when grown on their own roots. Besides cuttings the branches may also be layered in autumn and severed from the parent plant in spring or autumn if well rooted.

P. angustifolia. — A native of Italy and Spain, 8–10 ft. high, with dotted branches, linear lance-shaped leaves, and clusters of white flowers produced in May. *Brachiata*, *lanceolata*, *rosmarinifolia*, and *salicifolia* are forms or synonyms of this species, their chief peculiarities being expressed by the name. They require sheltered positions in northern parts of the country.

Culture &c. as above.

P. decora (*P. laurifolia; P. vilmoriniana*).—A beautiful shrub, 6-10 ft. high, native of Asia Minor, with oblong, lance-shaped, acute leaves, 4–6 in. long, deep green, leathery. Flowers in May, white, succeeded by reddish-purple fruits, about the size of Sloes, and ripe in September.

This is a much hardier plant than the 3 other species, and will stand frost when the others are badly injured. Owing to its smooth glossy leaves, it stands dirt and dust very well, and may therefore be recommended for shrubberies near large manufacturing towns. In nurserymen's catalogues it will be found under one or other of its synonyms, but rarely under its correct name, *decora*.

Culture &c. as above.

P. latifolia.—A fine ornamental shrub or tree, reaching a height of 20–30 ft. in S. Europe, its native habitat. Leaves ovate, rounded at the base, serrate, the young ones somewhat lobed at the base. Flowers in May, white.

This is a very popular plant for shrubberies, and has several varieties or synonyms, the best known being *ilicifolia* and *rotundifolia*.

Culture &c. as above.

P. media. — A native of S. Europe, 10-15 ft. high, with lance-shaped leaves slightly serrated in the middle, and 3-nerved. Flowers in May, white. *Pendula* is a variety with drooping branches and lance-shaped leaves; *buxifolia* has roundish Box-like leaves; and *virgata* (known also as *ligustrifolia* and *oleæfolia*) has oblong, lance-shaped, Privet-like leaves.

Culture &c. as above.

OSMANTHUS. — A genus with 7 species of smooth trees or shrubs, having opposite, evergreen, entire, or toothed leaves, and small flowers in axillary clusters, or racemes. Calyx 4-toothed.

Corolla with 4 broad, blunt lobes. Stamens 2, rarely 4. Ovary 2-celled. Drupe ovoid or round.

Culture and Propagation. — These plants thrive under the same conditions as the Phillyreas, and may be increased in the same way by means of cuttings inserted in sandy soil in late summer and autumn under handlights, or in cold frames; and also by layering the branches in autumn.

An excellent compost for these plants is a good rich sandy loam with the addition of a little peat or leaf mould; but they will also flourish in ordinary good and well-drained garden soil.

O. americanus. — A native of North America, about 6 ft. high, with somewhat 4-angled branches, and leathery, elliptic, lance-shaped, shining green leaves, about 4 in. long. Flowers in June, white, in clusters of three.

Culture &c. as above. This species is rarely met with in cultivation.

O. Aquifolium.—A handsome Holly-like Japanese shrub, 4–6 ft. high, with oval or oblong, prickly toothed, leathery leaves, of a deep shining green colour, and varying a good deal in size. Flowers in autumn, white, sweet-scented. *O. ilicifolius* is a form with a more dense and compact habit, and smaller leaves. There are also varieties of this with silvery and golden variegation, known respectively as *argenteo-marginatus* and *aureo-marginatus*. *Myrtifolius* has rigid Myrtle-like leaves, without spines; and *rotundifolius* has stiff leathery roundish leaves. The variety *purpurascens* is remarkable for the purple sheen of the young leaves, especially on the under surface. With the advance of age the purple tint gradually becomes dimmed, but the variety is always easily distinguished from any of the others; and it also bears the reputation of being much hardier than the variegated forms, and even the green ones.

Culture &c. as above.

O. fragrans (*Olea fragrans*).—A handsome shrub 6–10 ft. high, native of China and Japan. Leaves elliptic, lance-shaped, pointed, slightly serrate, about 2 in. long, shining green above, paler beneath. Flowers from June to August, white or yellowish, and deliciously fragrant.

Culture &c. as above. Except in the mildest parts of the south and west this shrub is not hardy in the open air. Wherever it can be grown out of doors, even with a little protection in winter, it is well worth the space it fills, owing to its neat appearance and the fragrance of its blossoms.

CHIONANTHUS (FRINGE TREE).—This genus contains 8 species of smooth or downy trees or shrubs, with opposite entire leaves, and white flowers in 3-forked panicles. Calyx 4-lobed. Corolla tube short, with 4 long, linear lobes. Stamens 2. Ovary 2-celled. Drupe ovoid or oblong, with one, rarely 2–3 seeds.

C. retusus.—A low-growing Chinese shrub, with long-stalked, obovate, retuse leaves, hairy on the under surface. Flowers in May, white, sweet-scented.

Culture &c. the same as for *C. virginicus* below.

C. virginicus.—An ornamental North American species 10–12 ft. high in this country, but often attaining a height of about 30 ft. in a wild state. Leaves smooth, oval, oblong, or obovate lance-shaped. Flowers in June and July, white, in long, drooping racemes, from the axils of the leaves, with narrow fringe-like petals which suggested the popular name of the genus.

Culture and Propagation. — This species and *C. retusus* require to be grown in warm loamy soil with sand, peat or leaf mould added. Although experience has proved the Fringe Tree to be hardy in most parts, it is apt to suffer in severe winters if exposed to bleak winds. Both species may be increased by imported seeds sown in cold frames, or by layers made during the autumn. Sometimes *C. virginicus* is grafted or embedded on the Common Ash and does very well. Cuttings of the ripened shoots may be inserted in sandy soil in cold frames and kept close and shaded for some time with a little attention, as they are not inclined to root very readily.

LIGUSTRUM (PRIVET). — A genus containing about 25 species of smooth bushes or shrubs with opposite entire leaves, and flowers usually white, in 3-forked panicles or clusters at the ends of the branches. Calyx truncate or 4-toothed. Corolla funnel-shaped, 4-lobed. Stamens 2. Ovary 2-celled. Berry somewhat drupaceous, with 1–3 seeds.

Culture and Propagation. — The

Privets are easily grown in any ordinary soil, but prefer a deep loam. Owing to their very smooth shining leaves being easily cleansed of dirt by the rain, the plants are useful for shrubberies near smoky towns. They are propagated by seeds sown in spring or the following autumn, after having been mixed and cleansed from pulp in sand. A better way, however, is to root cuttings of the green or ripened shoots in sandy soil under handlights or cold frames during the summer and autumn. The branches nearer the ground may also be layered during the same season. When grown as hedges, the plants are best clipped about September or October, and although they may look bare for a time, they will make beautiful green hedges by spring.

L. **coriaceum.** — This is a distinct Japanese plant rarely exceeding 3-4 ft. in height, and having blunt ovate-oblong or roundish deep glossy green leathery leaves, and greenish-white flowers in summer. There is a variety called *volutum* in which the leaves are somewhat rolled up. A good rock plant.

Culture &c. as above.

L. **Ibota** (*L. amurense*). — A pretty compact-growing Japanese shrub about 8 ft. high, with slender, twiggy branches, and bluntly ovate or elliptic, rarely lance-shaped leaves, the midribs of which are hairy on the under side. Flowers in summer, white, salver-shaped, freely produced in spikes.

Culture &c. as above.

L. **japonicum** (*L. glabrum ; L. Kellermanni ; L. Sieboldi ; L. syringæflorum*). A beautiful strong-growing Japanese Privet 6–8 ft. high, having oblong-ovate rather pointed glossy green leaves, and large clusters of white and slightly perfumed flowers in June. The variety *macrophyllum* is recognised by its larger and broader leaves, and *variegatum* by the leaves being edged and marbled with silvery-white.

This makes a splendid hedge, being far stronger and more ornamental looking than the common British Privet. The young growths are of a beautiful purplish tint, which looks charming against the deep green of the older foliage.

Culture &c. as above.

L. **lucidum** (*L. magnoliæfolium ; L. strictum*). — A handsome evergreen Chinese shrub 8–12 ft. high, known as the 'Woa Tree.' Leaves oval, oval-lance-shaped elliptic or roundish, shining green. Flowers in autumn, white, in terminal clusters. The variety *Alivoni* has dark green wavy leaves irregularly variegated with pale yellow. There is a form of *lucidum* in which the leaves are variegated with white; another with gold; and still another called *tricolor*.

Culture &c. as above.

L. **massalongianum** (*L. angustifolium ; L. myrtifolium ; L. rosmarinifolium ; L. spicatum*). — A pretty but not well-known evergreen shrub about 6 ft. high, native of the Khasia Hills, having smooth, linear lance-shaped, shortly stalked leaves, and white flowers, borne in summer in numerous, dense, much-branched panicles at the ends of the branches and emitting a peculiar odour.

Culture &c. as above.

L. **ovalifolium** (*L. californicum*).— A beautiful free-flowering Japanese Privet with oval or oval-elliptic or obovate shortly stalked leaves, deep glossy green above, paler beneath. Flowers in summer, white, in numerous clusters. The variety *variegatum* has beautiful yellow-blotched leaves when young, passing into a silvery variegation with age. The finest form, however, is that known as *aureum*, popularly called the 'Golden Privet,' now extensively cultivated on account of its beautiful golden and green foliage, which is remarkably brilliant at great distances when the plants are grown in masses. This variety must be grown fully exposed to the sun and away from the shade of trees, hedges or walls, to obtain the full glow of its golden colour. In the shade the leaves gradually revert to the green form. The tops of the shoots strike readily in cold frames in spring or autumn. Young plants make effective edgings, while older and taller ones make splendid hedges. There is a variety called *instabile* owing to the fact that the leaves are sometimes alternate, sometimes opposite, and sometimes in whorls of three.

Culture &c. as above.

L. **Quihoui.** — A somewhat straggling Chinese shrub about 6 ft. high, with wiry purplish branches covered with a slight down. Leaves oblong or oblong ovate. dark shining green. Flowers in October and November, later than any other species, white, in loose panicles at the ends of the branches and also in the axils of the upper leaves.

Culture &c. as above. Grows well in any poor soil, but of course does better in rich.

L. sinense (*L. Ibota villosum; L. villosum*). — A more or less evergreen Chinese shrub 12–20 ft. high, with ovate lance-shaped leaves, shining green above, hairy beneath. Flowers in summer, white, in loose terminal panicles. The variety *nanum* is a distinct and pretty form, somewhat horizontal in growth, having masses of creamy white flowers all over the plant.

Culture &c. as above.

L. spicatum (*L. nepalense*). — A deciduous species 6–8 ft. high, native of Nepaul. Leaves elliptic acute, hairy beneath as well as the branches. Flowers in summer, white, crowded, in spicate clusters.

Culture &c. as above. This species is rarely seen, and is probably not hardy in the colder parts of the kingdom.

L. vulgare (*Common Privet*). — A well known British shrub 6–10 ft. high, also distributed over Europe and N. Africa. Leaves elliptic lance-shaped, deep shining green. Flowers in summer, sweet-scented, white at first, but changing to reddish-brown in compound racemes, and succeeded by deep purple-black berries in autumn.

The variety *buxifolium* is distinct on account of its broader leaves, which persist much longer than those of the ordinary form. *Fructu-luteum* or *xanthocarpum* is denser in habit, and has bright golden-yellow berries; *pendulum* has a weeping habit, and is sometimes grafted on the top of a stem 4–5 ft. high, and *variegatum* has the foliage prettily marbled with a bright golden colour.

The Common Privet is a fairly good hedge plant, but used by itself, while nice and green, is very flexible and easily swayed by strong winds. It is used a good deal too much in shrubberies, where many finer and quite as hardy shrubs would grow well.

Culture &c. as above.

LXXII. APOCYNACEÆ—Periwinkle Order

An order of trees or shrubs, rarely herbs, often climbers, with milky juice. Leaves opposite, rarely whorled, entire. Stipules none or rudimentary. Flowers regular, hermaphrodite, solitary or in cymes. Calyx 4–5-lobed. Corolla gamopetalous, salver-shaped or funnel-shaped; throat naked or with scales; lobes usually oblique, twisted in bud. Stamens 5, rarely 4, on the tube or throat of the corolla; anthers free or united and adhering to the stigma. Disc none, or ringed. Ovary superior, consisting of 2 free or united carpels. Style short, dilated, with a thickened entire or 2-cleft stigma often constricted in the middle. Fruit of 2 many-seeded follicles, a berry, or drupe.

This order contains more than 100 genera and about 900 species mostly natives of the tropics and sub-tropics. The genera and species described below are about the only hardy representatives of the order grown out of doors in the British Islands, but there are a large number of beautiful species cultivated in hothouses.

AMSONIA. — A small genus of smooth or downy erect herbs or bushes with alternate membranous leaves, and mostly blue flowers borne at the ends of the branches in clustered or corymbose cymes. Calyx 5-parted. Corolla salver-shaped, with oblong or lance-shaped twisted lobes. Stamens 5. Ovary of 2 distinct carpels having a thread-like style surmounted by a thickened stigma. Follicles 2, erect, cylindrical, many-seeded.

Culture and Propagation. — Amsonias are pretty herbaceous perennials which flourish in partially shaded parts of the flower border or the margins of shrubberies in ordinary garden or peaty soil. They are usually increased by dividing the rootstocks in early autumn or spring. They may also be increased by cuttings of the shoots inserted in sandy soil under a handlight during the summer months. Seeds may also be sown in cold frames in autumn or spring, so that the seedlings may be ready for planting out in light fresh soil either in autumn or spring, according to the date of sowing.

A. salicifolia.—A pretty N. American perennial 1½–2 ft. high, with smooth lance-shaped acute Willow-like leaves. Flowers from May to July, pale blue, funnel-shaped, petals hairy on the inside. This is closely related to the following species, and is even regarded as a variety of it by some.

Culture &c. as above.

A. Tabernæmontana (*A. latifolia; Tabernæmontana Amsonia*). — A native of Carolina 1½–3 ft. high, with ovate lance-shaped acute shortly stalked leaves. Flowers in early summer, pale blue, with lance-shaped acute petals slightly hairy on the outside.

Culture &c. as above.

RHAZYA.—A genus having only a couple of species of smooth erect-growing bushes, with alternate thickish leaves and flowers in loose cymes or clusters at the ends of the shoots. Calyx with 5 tapering segments. Corolla salver-shaped, with a cylindrical tube, and 5 lobes twisted in bud. Stamens enclosed and seated above the middle of the tube. Ovary with 2 distinct carpels, becoming erect, and narrow cylindrical follicles when ripe.

R. orientalis. — An attractive little bush 1½–2 ft. high, native of Greece and S. Western Asia. The erect simple stems have lance-shaped acute leaves, 2–3 in. long, usually alternate, but occasionally opposite near the base. The starry soft blue flowers, with pointed segments, appear in June in loose clusters at the ends of the shoots.

Culture and Propagation. — This plant makes a compact bush, and flourishes in ordinary well-drained garden soil. It looks ornamental in the rock garden, and likes partially shaded positions. In bleak localities it may possibly require slight protection with a little straw or litter during severe frosts. It may be increased by cuttings of the non-flowering shoots inserted in cold frames in late summer and autumn.

VINCA (Periwinkle).—A genus containing about 10 species of erect or trailing herbs or undershrubs, with opposite leaves and rather large, solitary flowers in the axils of the leaves. Calyx 5-parted. Corolla salver-shaped with a cylindrical tube bearded within, and 5 broad twisted lobes. Stamens 5. Ovary of 2 distinct carpels, style thread-like, surmounted by a thick viscid stigma in a cup-shaped reflexed membrane. Follicles 2, erect or spreading, narrowly cylindrical, many-seeded.

Culture and Propagation.—The Periwinkles are well-known trailing perennials useful for covering banks, stumps of old trees, mounds of old stones or rocks, in the pleasure ground, wild garden, or woods. They grow in almost any soil and soon spread after becoming established, especially in partially shaded places. They may be increased by dividing the plants in either autumn or spring, or by portions of the trailing stems which may have developed roots in contact with the soil. The following are the only hardy species grown, but *V. rosea*, with rosy or white flowers, is a pretty greenhouse plant known as 'Old Maid' or 'Madagascar Periwinkle.'

V. herbacea. — A native of Eastern Europe, with stems at first erect, afterwards trailing, and rooting, flowering as they increase in length, and dying down in winter. Leaves about 1 in. long, somewhat 2-ranked, elliptic or lance-shaped, bluntish. Flowers from April to July, and again in September, purple-blue, bearded in the centre and at the throat, with obliquely ovate pointed corolla lobes.

Culture &c. as above.

V. major (*Band Plant; Cut Finger*). This is the larger Periwinkle, found in the woods, copses, and hedgerows of the British Islands. It has tough trailing stems, rooting at the tips or joints, and furnished with elliptic ovate, shortly stalked leaves 2–4 in. long. Flowers in April and May, about 2 in. across, bluish-purple, very rarely producing seed. The variety *elegantissima* has the leaves beautifully edged and marbled with creamy white. There is also a white-flowered variety, *alba*.

Culture &c. as above.

V. media (*V. acutiflora*).—A native of the Mediterranean region, with flowerless stems trailing, the others bearing the flowers erect and a foot or more high. Leaves ovate-elliptic, narrowed at both ends, shining green, 1–2 in. long. Flowers in August, blue, with obliquely ovate pointed lobes. Besides the names given above, this species is also known as *V. difformis*.

Culture &c. as above.

V. minor. — This is similar to *V. major*, but has much smaller leaves and flowers, the latter only about 1 in. across. There are also white- and red-flowered varieties, and others with varying shades of violet and purple, as well as one with double flowers, in white and blue. There are forms also with silver and golden variegated leaves.

Culture &c. as above.

APOCYNUM (Dog's Bane). — A genus of erect perennial or sub-shrubby, often glaucescent herbs, with opposite penniveined leaves, and small flowers in dense cymes or loose corymbs at the ends of the branches, or axils of the leaves. Calyx deeply 5-lobed. Corolla bell-shaped with 5 triangular appendages or scales at the mouth of the tube. Fruit of 2 slender follicles. Seeds feathery at one end.

Five or six species belong to this genus, but the following is the only one worthy of garden notice. *A. cannabinum* from N. America and *A. venetum* from the Mediterranean region are, however, occasionally seen in botanical collections.

A. androsæmifolium.—A very old garden plant, having been introduced from Virginia about 1683. It grows 1–2 ft. high, and has ovate stalked leaves, smooth shining green above, pale beneath. Flowers in July, bell-shaped, pale red with purple stripes.

Culture and Propagation. — This plant flourishes in peaty soil and may be grown in borders with Kalmias, Azaleas, and other peat-loving plants. It may be increased by division in spring, just as growth is about to begin. Seeds, if obtainable, should be sown as soon as ripe in cold frames in peaty soil. The seedlings should be pricked out when large enough, and may be transferred to the open border in mild weather in spring.

TRACHELOSPERMUM.—A small genus of smooth or slightly downy climbing shrubs with opposite leaves and loose cymes of white flowers borne at the ends of the shoots or near the axils of the leaves. Calyx small, 5-parted, furnished with 5–10 small scales or glands within. Corolla salver-shaped, with a cylindrical tube expanded about the middle and constricted at the throat, and 5 twisted oblong lobes. Stamens 5. Disc annular, truncate, or 5-lobed. Carpels 2, distinct. Follicles elongated, slender, incurved, terete.

T. jasminoides (*Rhynchospermum jasminoides*).—A beautiful slender climbing evergreen shrub, native of China and Japan although known as the 'Cape Jessamine.' The branches, which discharge a milky juice when cut, have the peculiarity of emitting roots in the same way as Ivy stems when they come in contact with the earth or moist surfaces. The leaves are oval lance-shaped, deep green, and quite smooth, although the young stems are slightly downy. The white salver-shaped flowers appear in summer, and are deliciously sweet-scented. There is a variety called *angustifolium* with smaller and narrower leaves than the type, but not quite so free flowering. There is also a form in which the leaves are variegated with white, but it is less hardy and not so vigorous as the others.

Culture and Propagation.—Although treated as a greenhouse plant when first introduced in 1846, this pretty plant has been proved quite hardy in the southern and milder portions of the kingdom, and will succeed in the open air almost as far as the Midlands if grown on a south wall. It enjoys a rich sandy loam and peat, thoroughly well drained, as stagnant moisture is hurtful to the roots especially in winter. It may be increased by cuttings of the young or half-ripened shoots inserted in sandy soil under handlights, and kept shaded and close for a time during the early summer months.

LXXIII. ASCLEPIADEÆ—Stephanotis Order

An order consisting of perennial herbs, shrubs, or undershrubs, of twining or prostrate habit, often with milky juice. Leaves opposite, or very rarely alternate or verticillate, without stipules. Flowers hermaphrodite, regular.

Calyx inferior, 5-lobed. Corolla gamopetalous, rotate, bell-shaped, rarely funnel- or salver-shaped. Stamens 5, free, or often united in a tube round the stigma. Pollen waxy—a peculiarity of this order and the Orchid family (p. 890).

This order contains about 150 genera and 1300 species, mostly natives of the tropics and sub-tropics, especially S. Africa, and only a few are hardy or worth growing in the open air in the British Islands.

PERIPLOCA (Silk Vine).—A genus containing about 12 species of smooth erect or twining shrubs with opposite leaves, and loose axillary or terminal cymes of flowers, which are purple or blackish inside, greenish outside. Calyx 5-parted. Corolla rotate, deeply 5-cleft, having a corona of 5 awned scales in the throat. Stamens attached inside the corona, filaments free. Pollen in masses, granular. Follicles cylindrical, smooth. Seed feathery, or silky-haired.

P. græca.—A quick-growing shrubby climber, native of S.E. Europe, Asia Minor &c., with leaves 3–4 in. long, and varying from ovate to lance-shaped. Flowers in July, greenish outside, blackish-brown within, densely covered with short hairs; corymbs on long stalks, emitting a somewhat disagreeable odour.

Culture and Propagation. — This plant is useful for covering walls, arbours, trellises, and such-like structures, during the spring, summer, and autumn months, but as the stems die down every winter, it is useless as a winter covering. It grows in ordinary garden soil, and may be increased by layers or cuttings, the latter being taken during the summer, and inserted in sandy soil under glass.

ASCLEPIAS (Swallow Wort).—A genus containing about 60 species of erect perennial herbs with opposite, verticillate, or rarely scattered leaves, usually with distinct transverse veins and flowers in simple, terminal, or extra-axillary umbels. Calyx 5-parted with 5–10 glands inside. Corolla rotate or reflexed with age, deeply 5-cleft, and having a corona of 5 scales attached to the staminal tube. Stamens on the base of the corolla. Pollen masses 10, waxy. Follicles usually 2, thickish, pointed. Seeds silky.

Culture and Propagation.—Only a few species are of garden value, and may be grown in peat or light rich soil in the flower border. They are increased by dividing the roots in spring, and sometimes by seeds sown at the same period in cold frames or greenhouses.

A. acuminata. — A native of New Jersey, about 2 ft. high. Leaves shortly stalked, ovate or somewhat cordate, pointed. Flowers in July, red and white, in solitary erect lateral umbels.

Culture &c. as above.

A. amœna.—A New England species 2–3 ft. high, recognised by having 2 rows of down on the stems. Leaves nearly sessile, oblong-oval, downy beneath, with a large purplish midrib. Flowers in July, rich purple, with the red scales of the corona protruding in the centre.

Culture &c. as above.

A. Douglasi. — A vigorous handsome N.W. American perennial with thick woolly simple stems, 2–3 ft. high, and shortly stalked ovate heart-shaped, tapering pointed leaves, over 6 in. long, smooth above, downy beneath. Flowers in summer, large, waxy, sweet-scented, purple-lilac, in many-flowered umbels.

Culture &c. as above. Sandy loam in the border or semi-wild parts.

A. incarnata.—A Canadian perennial with erect branching stems, somewhat downy towards the top. Leaves lance-shaped, rather woolly on both surfaces. Flowers in July, red or purplish, in numerous umbels.

Culture &c. as above. This species delights in moist soil by the margins of lakes, streams, ponds &c.

A. phytolaccoides.—A vigorous species 3–4 ft. high, native of the mountains of Virginia and Carolina, having purple-spotted stems and broad ovate-oblong acute leaves, smooth shining green above, paler beneath. Flowers in July, purple, with a white corona or crown in the centre.

Culture &c. as above.

A. purpurascens (*A. hybrida*). — A pretty perennial 2–3 ft. high, native of the shady swamps of Virginia. It has simple erect stems rather hairy at the top, and brownish-green towards the base, bearing large ovate leaves, having a purple midrib and a hairy under surface. Flowers in July, purple, in erect umbels.

Culture &c. as above for *A. incarnata.*

A. quadrifolia.—A distinct perennial about 1 ft. high, native of New York State, and readily distinguished by having its ovate tapering pointed leaves arranged 4 in a whorl in the middle, the others opposite, on erect simple smooth stems. Flowers in July, white or lilac-white, small, sweet-scented, with red nectaries in loose flowered umbels.

Culture &c. as above.

A. rubra. — A distinct Virginian perennial 1–2 ft. high, having ovate pointed deep green leaves, arranged alternately on the erect simple stems. Flowers in July and August, purple-red in large umbels.

Culture &c. as above.

A. syriaca (*A. Cornuti*). — A vigorous North American perennial with stoutish simple stems 3–5 ft. high, bearing oblong lance-shaped or bluntly oval leaves 4–8 in. long, downy beneath. Flowers in July, sweet-scented, pale purple, in large loose, drooping umbels.

Culture &c. as above. Delights in rich moist soil in shrubberies or copses, or parts of the wild garden. Increased by division. *A. Sullivanti* is similar to this species but has larger and deeper purple flowers.

A. tuberosa. — A handsome North American species 1–2 ft. high, with tuberous roots and purplish hairy stems branched at the top. Leaves scattered, opposite or in whorls of three, oval or oblong lance-shaped, hairy, narrowed at both ends and 2–3 in. long. Flowers from July to September, bright orange, very showy, in dense umbels from the axils of the upper leaves and tips of the branches. Known as 'Butterfly Weed' or 'Pleurisy Root.'

Culture &c. as above. This species flourishes in light sandy or peaty soil, in borders, the edges of shrubberies &c. When seeds ripen in this country, as is sometimes the case in favourable seasons, they may be sown in cold frames or gentle heat in autumn or spring, the seedlings being pricked off and grown on under glass until about the end of May, when they may be transferred to the open border. Established plants should be disturbed only about every third year, when they may be divided in the usual way.

A. variegata.—A vigorous species 3 to 4 ft. high, found on dry sandy hills from New York State to Carolina. It is recognised by its simple erect stems variegated or mottled with purple, and ovate, stalked, wrinkled leaves. Flowers in July, handsome, white, with a reddish corona in the centre, borne on hairy pedicels in dense umbels.

Culture &c. as above.

A. verticillata. — A native of New Jersey 1–2 ft. high, having a downy line on one side of the erect and often branching stems. Leaves very narrow, linear, thick, smooth, usually in whorls, but occasionally scattered. Flowers in July and August, yellowish-green, with a white corona, and borne in many-flowered umbels.

Culture &c. as above.

LXXIV. LOGANIACEÆ—Strychnine Order

An order consisting of herbs, shrubs, or trees, with opposite or rarely verticillate entire or toothed leaves, often with stipules between the stalks as in the Rubiaceæ (p. 486). Flowers regular or slightly oblique, hermaphrodite or more or less diœcious by abortion. Calyx inferior, 4–5 lobed or parted. Corolla gamopetalous, funnel- or salver-shaped, or rarely bell-shaped or rotate, 4–5- (rarely more) lobed; lobes valvate, imbricate or twisted. Stamens equal in number to the corolla-lobes, attached to the throat or tube of the corolla (reduced to 1 in *Usteria*, a native of tropical Africa). Pollen minutely granular. Ovary superior, 2- rarely 3–5-celled. Fruit a capsule, berry, or drupe.

There are about 350 species in this order, nearly all natives of the Tropics.

The 'Nux Vomica' or 'Strychnine' of commerce and other deadly poisons are obtained from plants belonging to this family.

GELSEMIUM.—A small genus of smooth climbing shrubs with opposite membranous leaves, and flowers in terminal or axillary, 1–3-flowered trichotomous cymes. Calyx 5-parted. Corolla funnel-shaped, widened at the throat, with ovate or oblong lobes. Stamens 5, attached to the corolla tube. Ovary oblong, 2-celled. Capsule ovoid or oblong, many-seeded.

G. sempervirens (*G. nitidum*). — A more or less climbing shrub native of the S. United States, with slender stems, downy when young, rough when old, and evergreen broadly oblanceolate pointed leaves 4–6 in. long, thin in texture and tapering towards the base. Flowers in March and April, deep yellow, with twisted lobes and a cylindrical tube over an inch long, and covered with short downy hairs.

Culture and Propagation. — This plant flourishes in ordinary good garden soil, but is too tender for northern parts of the country. It grows well in the neighbourhood of Torquay, but is a plant still very little known, although introduced 50 years ago. It may be increased by cuttings of the young or half-ripened shoots inserted in sandy soil under hand-lights during summer, and kept shaded and fairly moist until rooted.

SPIGELIA. — A genus containing about 30 species of annual or perennial herbs, rarely under-shrubs, with opposite, often membranous penniveined or rarely 3–5-nerved leaves. Flowers usually in one-sided spikes. Calyx 5-parted, often with 5 or more glands at the base. Corolla tubular or salver-shaped, 5-lobed. Stamens 5. Ovary 2-celled. Style thread-like, jointed near the middle. Fruit consisting of 2 few-seeded carpels.

The species described below is the only one suitable for outdoor cultivation in the British Islands.

S. marilandica (*Indian Pink; Maryland Pink Root; Worm Grass*).—A glowing N. American herbaceous perennial 6–18 in. high, with dense erect tufts of simple 4-angled stems bearing ovate-lance-shaped acute leaves without stalks. Flowers in summer, deep red outside and yellow within, 1½ in. long, with lance-shaped lobes, and borne in short simple or forked spikes.

Culture and Propagation. — This pretty plant is worthy of a place in the flower garden and may be grown in peaty borders with plants of the Heath order in partially shaded spots; or in moist similar spots in the rockery, or near water in boggy soil. Drought is injurious to it. It may be increased by dividing the roots in early autumn or spring, the latter season being probably the best.

BUDDLEIA (Orange Ball Tree). This genus contains about 70 species of trees or shrubs, rarely herbs, mostly native of the tropical and sub-tropical regions of America, Africa, and Asia. Leaves opposite, entire, crenulate, or rarely largely toothed. Flowers small, often in dense rounded or corymb-like axillary cymes, or in terminal corymbose clusters or panicles. Calyx bell-shaped, 4- toothed or cleft. Corolla sometimes with a short bell-shaped rotate tube, sometimes with an elongated cylindrical salver-shaped tube; lobes 4, ovate, imbricate. Stamens 4, attached to the throat of the corolla or lower down. Ovary 2-celled. Style often curved with a club-shaped or capitate apex.

B. Colvillei.—A beautiful shrub 6–8 ft. high, native of the Sikkim Himalayas, where it grows wild at an elevation of 9000–12,000 ft. The rather narrow lance-shaped acute and more or less serrate leaves are 4–6 in. long, and covered with a rusty down when young. The beautiful deep rose bell-shaped flowers about an inch across, with 4 recurved or wavy corolla lobes, appear in June and July, and are produced in loose opposite clusters in the upper portion and at the end of the shoots.

Culture &c. as for *B. globosa.* This species is hardy in the mildest parts of the south and west, and it is believed flowered for the first time in cultivation out of doors in Mr. Gumbleton's garden at Queenstown, Cork, in 1892.

B. crispa, a native of the Western Himalayas, having lilac flowers with a white eye; and *B. Lindleyana*, a Chinese species with hairy purple-red flowers, are more tender plants, which stand the winter only when very mild in the most favoured parts of the country. They may be treated in the same way as *B. Colvillei.*

B. globosa.—A unique and handsome Chilian shrub 12–20 ft. high, with somewhat 4-angled stems, which like the under surface of the leaves are covered with a hoary felt. Leaves about 6 in. long, lance-shaped, pointed, stalked and crenate. Flowers in May and June, in large brilliant ball-like heads of bright yellow.

Culture and Propagation.—This fine shrub is hardy in most places and is recorded as having stood 14° of frost without injury in Wales. In Devonshire and other southern parts it is frequently met with, and it is only during really severe winters that its quick-growing stems are cut down. New ones, however, rapidly spring up again and the plant is as good as ever. It thrives in a light rich well-drained soil, and flowers more freely if not cut about or pruned too much. It may be increased by cuttings of the fully ripened wood inserted in fine sandy soil in the autumn in cold frames or greenhouses, and only requires to be kept free from frost during the winter. When rooted the plants may be potted singly and placed on gentle bottom heat after a few days to start them well into growth. A little hardening off in cooler and more airy quarters will fit them for planting in the open border by June or July. Seeds are best sown in gentle heat in spring, the seedlings being pricked out and treated like the rooted cuttings.

B. japonica.—An interesting Japanese shrub 4–5 ft. high, with square stems and lance-shaped leaves 4–6 in. long. The pale lilac flowers appear in July and August in dense racemes 8–10 in. long, at the ends of the shoots. There is a superior form called *insignis* and another with deeper lilac flowers called *carnea.*

Culture &c. as above for *B. globosa.*

B. variabilis.—A very distinct species from Eastern Thibet. It grows 6–8 ft. high, and is remarkable for the woolliness or dense down on the stems and leaves, the latter being elliptic tapering and serrate, 6–10 in. long and thickly clothed with white down on the under side. The sweetly scented lavender flowers with a distinct deep orange centre appear from June to September and are borne in pyramidal clusters about 6 in. long at the ends of the shoots. Seeds are freely ripened.

Culture &c. as above for *B. globosa.* A handsome plant for massing in shrubberies or in beds on the grass.

DESFONTAINEA.—A genus containg only one species:—

D. spinosa.—A beautiful shining evergreen shrub about 3 ft. high, native of the Chilian Andes, with elliptic-oblong leathery spiny-toothed leaves, 2 in. long, and very much resembling some varieties of Holly. Flowers from June to August, tubular, scarlet, tipped with yellow, about 1¼ in. long, drooping, shortly stalked and solitary from the sides of the branches between the opposite leaves. Calyx cup-shaped, 5-cleft. Corolla tubular, 5-lobed. Stamens 5. Ovary usually 5-celled. Fruit a globose or ovoid irregularly 5-celled berry.

Culture and Propagation. — This distinct shrub will thrive under the same conditions and localities as *Buddleia globosa* in peat or light loamy soil. Cuttings of the ripened shoots may be rooted in light sandy soil, and there is more chance of success if they are placed in gentle heat under a bell-glass. The cuttings should be kept close and shaded from strong sunshine, and also sprinkled overhead every day until fairly well rooted. Small plants grown in pots make beautiful conservatory ornaments in districts where the plants are not quite hardy; but even in these localities the plants may be plunged in the open border during the summer months to flower.

LXXV. GENTIANEÆ—Gentian Order

An order of generally smooth annuals or herbaceous perennials, rarely shrubs or climbers. Leaves (except in *Menyanthes, Villarsia,* and *Limnanthemum*) opposite, entire, without stalks or stipules, often strongly 3–5-nerved, and sometimes connate. Flowers regular or slightly oblique, hermaphrodite, or very rarely polygamous by arbortion, solitary, or in 2–3-forked cymes. Calyx inferior, with a bell-shaped or very short tube, and having 4–5 (rarely

6–10) lobes or segments. Corolla gamopetalous, hypogynous, funnel-, salver-, or bell-shaped, or rotate, with 4–5 (rarely 6–12) lobes mostly twisted in bud. Stamens equal in number to the corolla lobes, and inserted on the tube with free filaments. Ovary superior, sessile or rarely stalked, composed of 2 carpels, 1- or partly 2-celled, many-seeded. Style simple, 2-lobed. Capsule membranous or hard, rarely fleshy.

There are over 500 species of herbaceous plants in this order distributed over almost all parts of the world, from the snowy mountain tops of Europe to the hot sands of S. America and India.

CHLORA (Yellow Wort). — A small genus consisting of erect glaucescent annuals or biennials with opposite and mostly connate leaves, and yellow flowers in loose terminal corymbose cymes. Calyx 6–8-parted. Corolla with a short rotate tube, deeply 6–8-cleft with oblong twisted lobes. Stamens 6–9. Capsule 2-valved, with numerous wrinkled seeds.

C. grandiflora. — A pretty glaucous biennial 6–12 in. high, native of Corsica and Sardinia, having simple or slightly branched stems, with elliptic oblong or triangular acute leaves, the lower ones narrow, the upper ones connate (*i.e.* united) at the base. Flowers in summer, bright golden-yellow, in forked clusters.

Culture and Propagation. — This species flourishes in light sandy soils with a little manure or leaf-mould, and makes a pretty border plant, although it is also useful for pot-culture. It may be increased by seeds, which are very small, and may be sown in a cold frame or in pots in spring without being covered. The seedlings are pricked out as usual, and by June the plants are ready for planting out, or growing on in the conservatory. The seeds may also be sown when ripe in cold frames, in order to obtain larger and sturdier plants for the open border the following spring.

C. perfoliata. — A pretty European annual about 1 ft. high, found growing in a wild state in chalky pastures, or banks, and limestone and clayey soils. The cylindrical stems are forked and bear at the base rosettes of oval leaves, those upwards near the middle being oval lance-shaped, while the rest are perfoliate, that is, as if the stems passed through them as shown in the Glossary, p. 18. Flowers in July, golden-yellow, in forked corymbs.

Culture &c. This may be grown like the larger-flowered *C. grandiflora*, and increased by seeds sown in spring to flower in summer, or in autumn in cold frames to flower in early summer.

C. imperfoliata and *C. serotina* are other yellow-flowered species, or varieties of the above seldom seen.

ERYTHRÆA (Centaury).—A genus containing about 30 species of erect stiffish or dwarf annuals or perennials with opposite stalkless and stem-clasping leaves. Flowers rose, yellow, or rarely white, borne in forked cymes at the ends of the shoots. Calyx tubular more or less deeply 5- or 4-cleft with keeled lobes. Corolla with 5, rarely 4, spreading lobes, twisted in bud. Stamens 5, rarely 4, attached to the slender corolla tube, and often protruding. Ovary 1-celled; style filiform, 2-cleft at apex. Capsule oblong or narrow.

Culture and Propagation.—These are pretty little rock plants and look effective if grown in rather bold masses. They flourish in light sandy soil either exposed to full sunshine or in partially shaded situations. The annual kinds may be raised from seeds sown in gentle heat about March, or in the open air in April. The perennial kinds may also be increased in the same way as well as by dividing the tufts in spring.

E. Centaurium (*Little Centaury*).—A pretty little British plant 6–18 in. high, the lower leaves of which are oblong spoon-shaped or ovate, the upper ones sometimes linear. Flowers from June to September, about ½ in. across, red or pink, borne in forked clusters. There are several forms of this species, one of the best being *littoralis* (or *linarifolia*) found on sandy shores. It grows 4–6 in. high, and has bright pink flowers.

Culture &c. as above. These plants may be grown in dry light soils, in hot sunny places.

E. Massoni (*E. diffusa*).—A native of the Azores, 4–6 in. high, with smooth shining, and usually concave leaves, and bright rosy flowers during the summer months. It is a pretty little rock plant.

Culture &c. as above. Increased by seeds and division.

E. Muhlenbergi.—A pretty Californian rock plant 6–8 in. high, with bluntly oblong leaves, or lance-shaped ones higher up the stems. The deep pink flowers with a white starry centre are about 3½ in. across, and appear in early summer, lasting some weeks. *E. venusta* is another Californian species, 6-10 in. high, with rosy star-shaped flowers, but it is an annual.

Culture &c. as above.

GENTIANA (GENTIAN).—This genus contains about 180 species of annual or perennial herbs with opposite and often stalkless leaves. Flowers axillary and terminal, sessile, or rarely stalked, erect, with or without 2 bracteoles, often showy, and blue, violet, purple, yellow, or white in colour. Calyx tubular, 5- (rarely 4- or 6–7-) cleft, winged, keeled, or naked, sometimes spathaceous. Corolla salver- or funnel-shaped or tubular bell-shaped, having the throat of the tube naked or furnished with scales or hairs; lobes 5 (rarely 4 or 6–7), spreading, twisted. Stamens equal in number to the corolla lobes, attached to the tube, enclosed or rarely protruding. Ovary 1-celled; stigma 2-lobed. Fruit a sessile or stalked, many-seeded capsule.

Culture and Propagation.—The Gentians are widely distributed, chiefly throughout the north temperate hemisphere, and are mostly found growing on the mountain sides at various elevations, some growing in chalky soils, some not. Many of the species unfortunately are somewhat difficult to grow well in British gardens, notwithstanding every effort to closely imitate their natural conditions. It is possible that this imitation of nature may in a good measure account for the failures, as it is likely the real essentials of success are not imitated at all. The soil is the chief thing imitated, but experience proves that plants which, for instance, grow luxuriantly on chalky soils in a state of nature promptly die in chalky soils when cultivated, and do much better without chalk at all as a matter of fact. The culture of a collection of various species of Gentian is therefore more or less an experimental matter, and some will be found to thrive where others fail. For general purposes, a rich, deep, sandy loam with a little peat and leaf mould in moist and not too sunny situations will suit Gentians. There should always be a free circulation of air, and it is safer to leave the plants alone for several years, as many will not bear disturbing. In fact, frequent disturbance with the object of increasing the number of plants is probably one of the causes of failure, and when plants are doing well they are best left alone. It is easy to add fresh soil from time to time, and sooner than risk losing the whole plant by dividing, it is better to obtain seeds and if possible sow them where they are intended to bloom. The soil can be prepared and protected by sheets of glass or small handlights. The seeds, which should be sown as soon as ripe, germinate very slowly and require careful attention, so that the soil never becomes dry or parched for want of water. Gentians are essentially plants for the rock garden, and where they flourish they shed in a small way a glow of the Alpine flora. Many of the species described below are very rare. *G. Amarella* (the Felwort), *G. germanica*, and *G. campestris* are native annuals with lilac, blue, or rarely white flowers.

G. acaulis (*Gentianella*).—A brilliant and easily grown species, 2–4 in. high, native of the Alps and Pyrenees, with 4-angled 1-flowered stems and tufts of ovate lance-shaped leaves at the base. Flowers from March to May, blue, about 2 in. deep, broadly bell-shaped, with 5 bands of yellow, dotted inside, and spreading, obtuse segments. There are many varieties of *G. acaulis* with flowers varying in colour from intense blue to white, all the forms except the white being spotted with blue on a greenish or yellowish ground in the throat. *G. alpina* is a distinct variety with small broad leaves; but there are others called *albomarginata*, *albocærulea*, *azurea*, *cælestina* &c., and one called *angustifolia* with narrower leaves than the type. *G. Clusi* from Switzerland resembles *G. acaulis*. It has lance-shaped acute leaves in rosettes, and solitary large dark blue flowers.

Culture and Propagation. — This species flourishes in deep, moist, loamy soil and will stand being divided much better than any other species. Early spring, just as growth is about to commence, is the best time for disturbing the plants. They make excellent edgings in somewhat shaded but open situations and are beautiful in nooks of the rock garden.

G. adscendens. — A Siberian species about 9 in. high, with lance-shaped leaves. Flowers in June and July, blue, bell-shaped, 5-lobed, with teeth between the segments produced in clusters in the axils of the upper leaves and at the ends of the shoots. There is a variety with smaller flowers and leaves named *minor*.

Culture &c. as above. This species has rather long fleshy roots, and should be grown in deep rich sandy loam, with a little peat or leaf mould. It requires a partially shaded position, and the flowers often appear up to September.

G. affinis.—A N. American species 4–12 in. high, with oblong, lance-shaped or linear leaves. Flowers in summer, blue, narrowly funnel-shaped, about 1 in. long, having short scale-like teeth between the lobes, and unequal linear or awl-shaped calyx-lobes.

Culture &c. as above. This species is often more or less trailing in habit, and looks well in the rockery facing north.or east.

G. algida.—A native of Siberia, 3–6 in. high, with somewhat 4-angled or roundish stems and linear lance-shaped leaves. Flowers in June and July, milky-white, dotted and striped with blue; lobes of the large, bell-shaped, 10-cleft corolla purple-blue.

Culture &c. as above.

G. Andrewsi.—A native of N. America 1–2 ft. high, with rounded stems and oblong lance-shaped leaves. Flowers in August, blue, swollen bell-shaped, about 1 in. deep, with 5 obtuse, entire segments and 5 smaller accessory fringed ones, borne in axillary and terminal clusters.

Culture &c. as above. This species when well established always flowers freely. It may be grown in boggy parts of the garden, or in borders or rockery in moist sandy soil. May be increased by division in spring.

G. asclepiadea (*Swallow Wort*). — A handsome species 6–18 in. high, native of Southern Europe, with erect, slightly 4-angled stems swollen at the joints. Leaves ovate lance-shaped, 5-nerved, about 2 in. long, broad and clasping at the base. Flowers in July, rather large, bell-shaped, purple-blue with dark dots inside, solitary in the leaf-axils, and crowded at the tips; corolla 5-cleft, with ovate acute lobes. There is a scarce white-flowered variety called *alba*.

Culture &c. as above. This species flourishes in partially shaded spots and may be naturalised in moist places in woods, and is also useful for the border, edges of shrubberies, and parts of the rockery facing north. It dies down in winter but the stems shoot up again in spring, before which it may be divided if necessary. Seeds are freely produced and may be sown when ripe as above recommended.

G. bavarica.—A beautiful alpine species about 3 in. high, with small, very blunt obovate Box-like leaves crowded at the base. Flowers in July, large, beautiful blue, freely produced on 1-flowered stems; corolla 5-lobed, with a long cylindrical tube and 5 horn-like scales between the lobes.

Culture &c. as above. This species must be grown in wet, boggy soil in the rockery or near the edges of water, in such positions, however, that the water will not become stagnant. *G. brachyphylla* is a close low-growing plant near *G. bavarica*, and requires similar treatment.

G. Bigelovi.—A native of New Mexico, 1–1½ ft. high, with linear or linear-oblong leaves about 2 in. long. Flowers in August, violet, about 1 in. deep, arranged in a leafy spike in the axils of the leaves.

Culture &c. as above.

G. Burseri.—A Pyrenean species about 2 ft. high, with opposite, ovate, apiculate leaves sheathing at the base. Flowers in July, yellow, in whorls or clusters at the ends of the shoots. Corolla bell-shaped, 5-cleft, dotted with purple inside, and having a small tooth between each lance-shaped segment. It is supposed to be a hybrid between *G. lutea* and *G. punctata*.

Culture &c. as above. This plant flourishes in peat and loam, and owing to its vigorous growth, and the peculiarity of sending up shoots from the base, it should be given plenty of space to develop.

G. calycosa.—A Californian Gentian 4–6 in. high, with somewhat connate ovate leaves about an inch long. Flowers deep blue, dotted with white at the base of the spreading lobes, about 1½ in. long, and borne singly at the tips of the shoots.

Culture &c. as above.

G. ciliata.—A native of the German mountains, with flexuose angular stems about 9 in. high, and lance-shaped and linear leaves. Flowers in August and September, pale blue; corolla 4-lobed, with serrated segments finely cut in the middle.

Culture &c. as above. This species grows well in rather dry positions, and may be used in such places in the rockery, between masses of stone.

G. crinita. — A N. American species, 6–9 in. high, with erect rounded stems, and lance-shaped acute leaves. Flowers in June and July, pale or indigo blue, with a 4-lobed, finely cut or fringed corolla.

Culture &c. as above. This species grows well in moist peaty well-drained soil in partially shaded spots.

G. cruciata. — A native of the Alps, with ascending rounded stems about 1 ft. high, and broadly lance-shaped leaves united at the base. Flowers in June and July, pale blue dotted with green in the throat, crowded in the axils of the leaves and the ends of the stems; corolla tubular bell-shaped, with 4 lobes, arranged crosswise, and having a small sharply 2-cleft or jagged scale between the lobes.

Culture &c. as above. This species is easily grown in the ordinary flower border in open sunny or partially shaded positions. It has, however, a somewhat straggling and untidy habit, and is on the whole more suited for the rock garden.

G. decumbens.—A Himalayan species with linear lance-shaped leaves, having roughish margins. Flowers in summer, blue, narrowly funnel-shaped, with 5 short ovate lobes, borne in racemose cymes.

Culture &c. as above.

G. Fetisowi.—A very smooth tall-growing species, native of Turkestan, having narrow lance-shaped 5-nerved leaves clustered at the base. Flowers in July and August, deep blue, in dense terminal clusters, and solitary or clustered in the axils of the leaves; corolla tubular, bell-shaped, with slightly acute segments. *G. Olivieri glomerata* is a similar plant from the same region, but has narrower leaves.

Culture &c. as above.

G. frigida.—This Gentian is a native of the alpine regions of the N. hemisphere, and seldom grows taller than 6 in. high. The leaves are narrow, thickish, and linear, and the funnel-shaped flowers, about 2 in. long, are produced in August and September, 1–3 at the tips of the shoots. They are yellowish-white in colour, dotted with purple, and last well.

Culture &c. as above. This species likes rich moist peat and loam, and open situations facing north or east.

G. Frœlichi.—A stemless species native of Carinthia. It has rosettes of thickish linear oblong leaves, and produces large solitary blue flowers in summer, on stalks ½–1½ in. long, with a pair of leafy bracts at the base of the 5-toothed calyx.

Culture &c. as above.

G. gelida.—A Caucasian plant about 6 in. high, with ascending 4-angled stems and lance-shaped leaves. Flowers in June and July, blue, bell-shaped, clustered in the axils of the leaves and tips of the shoots; corolla 5-lobed, with short alternating jagged scales.

Culture &c. as above.

G. Kesselringi.—A native of Turkestan with stems about 8 in. high, with linear lance-shaped acute leaves at the base, and oblong-lance-shaped ones higher up. Flowers in July and August, whitish, dotted outside with violet, in terminal clusters; corolla tubular, swollen in the middle, and having 5 ovate spreading lobes.

Culture &c. as above.

G. Kurroo (*Pneumonanthe Kurroo*). A handsome Himalayan rock plant having bright green, very leathery leaves, elongate, linear or oblong lanceolate in shape, and channelled above. Flowers from July to October, sky-blue, dotted with white in the throat; corolla narrowly bell-shaped, with 5 broadly ovate acute or pointed lobes. There is a variety called ***brevidens***, with a dwarf spreading or trailing habit, and blue flowers.

Culture &c. as above. This is a very free-growing species and if left undisturbed will make fine masses in the border or rockery. It flourishes in a mixture of well-drained moist peat and loam, and during the summer months should be freely watered.

G. linearis (*G. pseudo-pneumonanthe*). A N. American species with slender stems

1-2 ft. high, bearing linear or narrowly lance-shaped leaves. Flowers in summer, deep blue lined with white, 1-5 in a terminal cluster; corolla 1 in. or more deep.

Culture &c. as above. This species very often does not exceed a foot in height. It enjoys a warm sunny position in the rock garden in moist but well-drained peat and gritty loam.

G. lutea.—A vigorous European perennial 4-6 ft. or more high, with broadly ovate or ovate-oblong leaves like those of the False or White Hellebore (*Veratrum*), with 5 prominent veins on the under surface. Flowers in July, yellow, veined and spotted, in whorls at the upper joints. *G. Charpentieri* is supposed to be a hybrid between this species and *G. punctata*, as is also *G. Burseri*. It has yellow flowers dotted with red.

Culture &c. as above. Planted in groups in semi-wild grassy places *G. lutea* becomes very effective, especially if grown in a deep rich moist loam in shaded or sunny situations. It may be increased in spring by dividing the spindle-shaped branching roots, which are blackish outside, and yellow and spongy in the interior, and from which the Gentian Root of commerce is obtained.

G. macrophylla.—A Siberian species 6-12 in. high, with rounded stems almost leafless in the middle. Lower leaves lance-shaped, 6-12 in. long. Flowers in July, pale blue, tubular, bell-shaped, 4-5-cleft, in terminal clusters.

Culture &c. as above for *G. cruciata*.

G. moorcroftiana. — A Himalayan annual 4-10 in. high. Leaves 1-1½ in. long, linear oblong or elliptic, without nerves. Flowers in summer, pale blue, solitary, at the ends of the branches, or in leafy cymes. Corolla ¾-1 in. long, funnel-shaped, naked, and without folds.

Culture and Propagation. — This species is closely related to the native *G. campestris*, and is probably a geographical form of it. It may be increased by sowing seeds annually in cold frames or in spots where the plants are to bloom and protecting them with handlights until well above the soil.

G. nivalis. — A very smooth biennial species, native of the Alps and Pyrenees, having rather large 5-lobed flowers of an intense deep blue, at the ends of the branches 3-4 in. high, and usually branching from the base. Leaves small, shining green, the lower ones in the rosettes, and obtusely oval.

Culture and Propagation. — This species requires the same general treatment as *G. verna*, but owing to its biennial character should be raised from seeds sown as soon as ripe every year.

G. ochroleuca (*G. intermedia*). — A United States species about 6 in. high, with obovate-oblong 3-nerved leaves. Flowers in summer, blue, in clusters at the ends of the branches. Calyx leafy, unequally lobed. Corolla inflated in the middle, 5-cleft.

Culture &c. as above.

G. ornata. — A beautiful Himalayan species with ovate or linear lance-shaped, acute or pointed deep green leaves having a pale green midrib. Flowers in May, whitish, striped with blue, somewhat cylindrical, a little inflated, and produced singly at the ends of the shoots; lobes 5, intensely blue, small, triangular.

Culture &c. as above. This species flourishes in moist and well-drained peaty soil in partially shaded situations. The stems are only 3-4 in. long, and spread from the centre of the plant, forming tufts.

G. pannonica.—An alpine species 1-2 ft. high. Lower leaves ovate apiculate; stem leaves ovate lance-shaped, flower leaves tapering, on slightly 4-angled stems. Flowers in June and July, bell-shaped, 6-7-lobed, purple, beset with dots, and having a yellowish tube. They are produced in clusters in the axils of the upper leaves and at the end of the shoots.

Culture &c. as above.

G. Pneumonanthe (*Wind Flower*).—A pretty British species 1-2 ft. high, with 4-angled stems; also found throughout the N. hemisphere. Leaves 1-1½ in. long, linear oblong, blunt, 1-3-nerved. Flowers in August and September, deep blue, funnel-shaped, 1-2 in. deep, 5-lobed, with a small green tooth between the lobes.

G. arvernensis is a sturdy little Gentian, closely allied to this species, and probably only a form of it, but is more robust and tufted in habit, and has deeper blue flowers, and finer and broader leaves. There is also a white-flowered variety of *G. Pneumonanthe* and others. *G. triflora* from the mountains of Central Asia, with large handsome, deep blue flowers, is also very near, as is also the Caucasian *G. barbata*, which grows 9–12 in. high, and has erect blue flowers.

Culture &c. as above. They all like deep, moist, or half boggy situations in the rockery, and may be increased by careful division or seeds.

G. punctata. — A native of the Alps 1–2 ft. high, with somewhat 4-angled stems, and ovate acutish leaves, lower ones stalked, upper ones tapering. Flowers in June, large, bell-shaped, in whorls; corolla yellow, dotted with numerous purple spots, and 6–8-lobed.

Culture &c. as above.

G. purpurea. — A European species 1-2 ft. high, with faintly 4-angled stems. Lower leaves ovate, passing upwards into ovate lance-shaped and broadly lance-shaped, united and sheathing at the base. Flowers in June and July, 3–8 at the ends of the branches, solitary in the leaf axils; corolla purple, lined and dotted inside, leathery in texture, bell-shaped; tube striped with greenish-yellow. *G. gaudiniana* is supposed to be a hybrid between this species and *G. punctata*. It is a native of Switzerland, and is a more vigorous plant than *G. purpurea*. The flowers are lurid purple, with more pointed corolla-lobes.

Culture &c. as above.

G. pyrenaica. — A pretty Pyrenean species, about 3 in. high, with procumbent or trailing stems branching at the base, the flowerless ones being densely leafy. Leaves lance-shaped linear, the lower ones in rosettes, the upper ones united at the base and sheathing. Flowers in April, solitary at the ends of the branches; corolla funnel-shaped, pale green outside, deep blue within, 5-lobed, with smaller oblong obtuse crenulate segments alternating.

Culture &c. as for *G. verna*.

G. quinqueflora. — A N. American species about 1½ ft. high, with stem-clasping, deltoid, heart-shaped, 3-5-nerved leaves. Flowers in October, lilac, 3–5 together in clusters at the ends of the branches; corolla narrowly funnel-shaped, calyx very short, acute-lobed.

Culture &c. as above.

G. Saponaria (*G. Catesbæi*).—A native of Carolina with roundish minutely downy stems, 6-18 in. high, and short, elliptic-ovate, acute leaves with roundish edges. Flowers in August, pale blue, in terminal clusters; corolla bell-shaped, 5-lobed, somewhat inflated in the middle, with 5 jagged teeth between the lobes. There is a white-flowered variety.

Culture &c. as above for *G. Andrewsi*.

G. septemfida. — A pretty Persian species 6–18 in. high, with simple erect 4-angled, purplish stems. Leaves united at the base, shining green, bluntly lance-shaped, 3-nerved, and about 3 in. long. Flowers in June and July, in clusters in the axils of the leaves, and at the ends of the branches; corolla bright blue, with a white crescent-shaped blotch at the base of each segment at the mouth of the funnel-shaped tube. The variety *cordifolia* (often cultivated as *G. gelida*) has ovate heart-shaped 5-nerved dark green leathery leaves and compact heads of deep blue flowers.

Culture &c. as above. This species flourishes in sandy soil in the rockery or flower border in fairly sunny positions.

G. tibetica. — A distinct Himalayan species about 2 ft. high, remarkable for its large bright shining green leaves about a foot long and 8 in. broad. The flowers appear in July and August, and are greyish-white.

Culture &c. as above.

G. verna. — A charming species 1–3 in. high, found on the mountain pastures of Central and S. Europe, and in the northern parts of England, and the West of Ireland. Leaves ovate acutish, lower ones crowded, upper ones in pairs. Flowers in April and May, brilliant blue, solitary at the tips of the simple stems; corolla salver-shaped, 5-cleft, with 5 small alternating bifid scales.

Culture and Propagation. — This species flourishes in deep sandy loam, with which pieces of limestone rock may be mixed. It loves open sunny places away from taller overhanging plants, and a plentiful supply of moisture during the summer months, and whilst making its new growths. It is a particularly suitable rock plant, but may also be grown on the edges of flower borders in moist deep sandy loam, kept together by means of stone or chalk rock. Seeds may be sown as soon as ripe, or the plants may be very carefully divided in early spring.

G. Walujewi.—A native of Turkestan, with solitary or twin stems arising from the rosettes of lance-shaped leathery leaves narrowed into stalks; the upper ones on the stem being stalkless. Flowers late in summer, whitish, dotted with pale blue, and crowded at the ends of the branches; corolla ½ in. across, with elliptic-lance-shaped acute lobes.

Culture &c. as above.

SWERTIA (Felwort). — A genus containing about 40 species of erect annual or perennial herbs with simple or branching stems. Leaves opposite, or radical in the perennial kinds, long-stalked, those of the stem sometimes alternate. Flowers blue, rarely yellow, cymose or loosely pedicellate, in raceme-like or corymbose clusters. Calyx 4-5-parted, with linear lance-shaped 1-3-nerved segments. Corolla tube very short, rotate, with 4-5 twisted lobes. Stamens 4-5 attached to the base of the corolla. Ovary 1-celled.

Culture and Propagation.—Only a few species are of any garden value. The annuals may be raised from seed sown in gentle heat in March, the seedlings being transplanted at the end of May to the open border where they are to flower. The perennial kinds may be increased by division in spring, or early autumn; and also by means of seeds sown when ripe, or in spring in cold frames, and transplanted in spring. Ordinary garden soil will suit them very well, but a mixture of peat and sandy loam is preferable. The plants are suitable for the rock garden or border, and are best in damp and partially shaded situations.

S. alata (*Ophelia alata*).—An Indian annual 1-2 ft. high, with 4-angled, often 4-winged stems, and ovate acute leaves. Flowers in summer, bright greenish-yellow veined with purple, in large panicles.

Culture &c. as above.

S. angustifolia (*Ophelia angustifolia*). An Indian annual 1-2 ft. high with narrow lance-shaped leaves. Flowers in summer, usually white, dotted with blue or black; sepals often longer than the corolla.

Culture &c. as above.

S. corymbosa (*Ophelia corymbosa*). A 4-angled or 4-winged Indian annual, 8-20 in. high, with obovate, spoon-shaped or ovate oblong leaves ½-¾ in. long. Flowers in May, pale blue, or white with blue veins, in flat-topped corymbs. *S. trichotoma* with elliptic lance-shaped leaves and white flowers is closely related to this species.

Culture &c. as above.

S. paniculata (*Ophelia paniculata*). A pretty Indian annual about 1 ft. high, with oblong or lance-shaped leaves. Flowers in summer, white with two purple or bright green marks at the base of the corolla lobes.

Culture &c. as above.

S. perennis. — A distinct European perennial about 9 in. high, with erect, simple, slightly 4-angled stems, and stalked, ovate, or elliptic bluntish leaves. Flowers in July, dull greyish-purple with dark spots, borne in erect spikes.

Culture &c. as above. An interesting perennial suitable for boggy or moist peaty spots in the rock garden. It may be raised from seeds sown in spring under glass, or by dividing the roots. This is the best known and most desirable species.

S. purpurascens.—An Indian annual 1-3 ft. high, having oblong or lance-shaped leaves about 1½ in. long. Flowers in June, purple or dark-red, in many-flowered leafy panicles.

Culture &c. as above.

MENYANTHES (Buck or Bog Bean). — A small genus of aquatic or marshy perennials with long, thickish creeping stems. Leaves alternate at the base of the stems with sheathing stalks, and composed of 3 entire or roundish kidney-shaped leaflets. Flowers white or blush, in racemes at the end of a scape or long stalk. Calyx 5-parted with oblong lance-shaped segments. Corolla shortly funnel-shaped, 5-cleft to the middle, the inner surface of the lobes being crested or fimbriated. Stamens 5, affixed to the corolla tube, and having arrow-shaped anthers. Glands 5, hypogynous. Ovary 1-celled; stigma 2-lobed.

Culture and Propagation.—The Bog Beans are easily grown in shallow water or very marshy soil. In water there should be a good layer of muddy soil at the bottom for the creeping roots to ramble in. The plants may be easily increased by dividing the rootstock, each portion being pegged down in the mud so as to induce new roots to develop more quickly and thus establish the plant.

M. Crista-galli (*Villarsia Crista-galli*).—A North American marsh plant with long-stalked kidney-shaped crenate leaves 2–4 in. wide. Flowers in spring, white, in simple or forked cymes. Corolla lobes naked with the exception of a hairy crest down the centre.

Culture &c. as above.

M. trifoliata (*Marsh Trefoil; Common Buckbean*). — A pretty perennial found growing wild in the marshy bogs of the British Islands, and having trailing matted stems covered by the leaf-sheaths. Leaves on stalks 3–7 in. long, and composed of 3 oblong or obovate blunt leaflets 1½–3 in. long. Flowers from May to July, white inside, pink or reddish outside, with purple-red anthers, and crested and beautifully fringed corolla-lobes.

Culture &c. as above.

VILLARSIA. — A genus containing about 10 species of marshy herbs with long-stalked radical entire or irregularly sinuate-toothed leaves. Flowers yellow or white. Calyx 5-parted or deeply cleft into lance-shaped segments. Corolla broadly bell-shaped, somewhat rotate with or without fringed margins. Stamens 5, with narrow arrow-shaped versatile anthers. Ovary 1-celled.

V. parnassifolia.—A pretty Australian plant with oval or almost round leaves with entire sinuate or crenulate margins. The naked flower stems are about 12–18 in. high, and bear panicles of yellow flowers in August.

Culture and Propagation.—This plant will grow in the open air in marshy places or in moist peaty soil in the milder parts of the kingdom, and may be used with the Buck Bean or Floating Heart. It may be increased by dividing the roots, or by means of seeds sown when ripe, or in spring, in moist sandy soil.

LIMNANTHEMUM (Floating Heart).—About two dozen species have been described as belonging to this genus, but the one mentioned below is the only one grown out of doors in the British Islands. The chief characteristics of the genus are: Aquatic herbs with creeping roots, and ovate or roundish deeply heart-shaped, entire, or obscurely sinuate leaves. Flowers yellow or white; peduncles 1-flowered, in pairs, or often several at the leafy joints. Calyx 5-parted with oblong lance-shaped segments. Corolla somewhat rotate deeply 5-cleft with entire or fringed lobes. Stamens 5 attached to the base of the corolla. Ovary 1-celled; stigma 2-lobed. Capsule ovoid or oblong, indehiscent or irregularly ruptured.

L. nymphæoides (*L. peltatum; Villarsia nymphæoides*).—A pretty native aquatic perennial found in still waters in various parts of the British Islands. It has a creeping rootstock, with alternate stalked roundish leaves, deeply heart-shaped at the base, quite entire or slightly toothed or sinuate, shining green and spotted with purple. Flowers in July and August, 1 in. across, bright yellow, with fringed edges, crowded on stalks 1–3 in. long.

Culture and Propagation. — This species may be grown in tanks, pools, lakes &c., with a muddy bottom for the creeping roots. The small Water-Lily-like leaves float on the surface of the water, above which are raised slightly the bright yellow flowers. It may be increased by dividing the rootstock as in the case of the Bog Bean, or by seeds sown in the mud as soon as ripe.

LXXVI. POLEMONIACEÆ—Phlox Order

An order of erect or rarely climbing, smooth, downy, or clammy herbs, rarely shrubs, with alternate or opposite entire or variously cut leaves. Flowers often showy, regular or slightly oblique, hermaphrodite, in corymbose cymes, heads, or loose panicles at the ends of the branches; or solitary or in pairs in the axils of the leaves, sessile or stalked. Calyx inferior, bell-shaped or tubular, shortly or deeply 5-cleft. Corolla gamopetalous, funnel-, salver-, or bell-shaped or rotate, with 5 twisted lobes. Stamens 5, equally or unequally attached to the corolla tube. Ovary superior, 3-celled. Style simple, thread-like, with a 3-cleft stigma. Capsule few- or many-seeded.

PHLOX.—A genus containing less than 30 species of erect or spreading, tall or tufted perennial herbs, rarely annuals, with entire leaves, those on the stem being opposite, or alternate at the top. Flowers usually showy, sometimes solitary at the ends of the branches among the leaves, sessile or stalked, sometimes in cymes, arranged in terminal, corymbose or clustered panicles. Calyx tubular bell-shaped, 5-ribbed, more or less deeply 5-lobed. Corolla red, violet, or white, salver-shaped, with a slender tube narrowed at the mouth; lobes 5, equal, obovate, rounded or obcordate, twisted in bud. Stamens 5. Ovary oblong or ovoid. Capsule ovoid, 3-valved. Cells 1-seeded.

With the exception of the beautiful annual *P. Drummondi*, all the Phloxes are perennials. Only a few of the natural species are grown in gardens, most of the kinds met with being hybrid forms of two or three species. Of late years these have become immensely popular with all lovers of outdoor gardening, owing to their great hardiness, the size, beauty, freedom and great variation in colour of their flowers, and the ease with which they may be successfully grown and multiplied. They are excellent plants for the border, or in groups by themselves, and from June almost until the end of September continue to produce masses of bloom which are very valuable in a cut state for decorative purposes.

Culture and Propagation.—Perennial Phloxes flourish in any fairly good garden soil, especially if enriched by the addition of manure. In the spring after the plants have begun to grow, a good mulching of well-rotted manure or the remains of spent mushroom beds will be of great value and induce vigorous growth and freedom of flowering. During hot dry summers the soil should receive copious waterings, as the leaves and flowers of the Phlox readily droop in the absence of moisture from the roots. If possible they should be planted in an aspect facing west or south-west or even north-west, rather than due south, as the full glare of the sun, even when the soil is moist, causes too much evaporation from the flowers, and if they can receive a little shade during the hottest part of the day they retain their freshness of colour and form much longer. As in the case of the *Pyrethrum* (see p. 585), if the first spikes of bloom are cut away as soon as over, and the plants given a good soaking of water, a fresh set of shoots will develop and produce another crop of flowers in autumn, and these are very often superior to the first.

Phloxes are usually increased by dividing the 'stools' in spring just as growth begins; by cuttings of the roots and shoots, and by seeds. If the plants are carelessly or clumsily divided, a good deal of injury is done to the young shoots and roots, and the divided portions take a rather long time to recover and establish themselves properly. Consequently they produce only poor or medium-size trusses of bloom. The more carefully the stools are divided with a sharp strong knife (instead of chopping up with a spade) the more likely are good results to be obtained during the season.

Phloxes are easily increased by cuttings, especially if it is not advisable to disturb the stools. When the shoots have grown about 2 in. high in spring they may be severed with a sharp knife just below a joint, and inserted in fine sandy soil in a cold frame, where they will root freely. Or each cutting may be put in similar soil in a small pot and plunged in bottom heat in a greenhouse or hotbed to get roots to form more quickly. It is scarcely a wise practice, however, to break down the hardiness of a perfectly hardy plant by making its tissues tender under artificial heat. It was this practice that chiefly led to the destruction of Hollyhock by the fungus referred to at p. 273, and where cuttings root freely in cold frames there is no need to place them in heat. When well rooted the plants may be placed by themselves in a partially shaded or not too sunny part of the border about the end of May, when they will grow well and probably flower profusely the first year. Instead of planting out they may be grown on in pots for the first season and used for the decoration of the greenhouse or conservatory.

Root cuttings are not often employed, but when used the oldest and healthiest roots may be cut into pieces about ½ in. long, and placed lengthways on the soil and slightly covered with soil as if they were seeds. They will 'break' or sprout more quickly if placed in gentle heat. The leaves with a piece of the stem attached are also said to root, but so slowly that it is only waste of time raising Phloxes in this way.

In warm seasons Phloxes seed fairly freely. When ripe the seed may be gathered and placed to dry thoroughly on a shelf. About the first week in February it may be sown in pots or pans and placed in gentle heat. When large enough to handle the seedlings may be pricked out into good soil in boxes or pans and kept close and warm for a time, and afterwards placed near the glass to become sturdy. By May they will be fit for planting out like the rooted cuttings, and may be treated like them. They will flower not very well the first season, but will become quite established by the second. Raising Phloxes from seed is very interesting, and it is by this means that many of the very fine garden varieties now so much grown have been raised. Any specially fine varieties can be increased and kept true by cuttings or division.

The following is a description of the typical species best known, after which will be found a rather full list of the best early and late flowering garden varieties for the flower garden.

P. amœna (*P. pilosa amœna*). — A pretty, softly hairy species 6–15 in. high, native of Virginia to Florida, with simple ascending stems. Leaves slightly erect, oblong or linear lance-shaped, acutish or obtuse. Flowers in June, purple or pink, rarely white, in compact corymbs, and having obovate entire, rarely emarginate, corolla lobes.

Culture &c. as above. Useful for the rockery or border in good garden soil. Increased by division and cuttings.

P. divaricata (*P. canadensis*). — A beautiful N. American species, 9–16 in. high, with downy spreading stems, and intermediate between the dwarf and tall kinds. Leaves clammy, oval lance-shaped, lower ones opposite, about 1½ in. long, upper ones alternate. Flowers in spring and early summer, pale lilac or bluish, in forked corymbs; lobes of the corolla obcordate, notched at the end, or sometimes entire, very much resembling those of the Periwinkle (Vinca, p. 645). There is a white-flowered variety *alba*.

Culture &c. as above. Borders and the rockery. Increased by division and cuttings.

P. Drummondi.—A beautiful and well-known half-hardy annual, native of the United States (Texas &c.), with erect, hairy stems, simple at the base, but branched a little at the top. Leaves ovate lance-shaped, half stem-clasping, mucronate and downy, lower ones opposite, upper ones alternate. Flowers in summer, varying in colour from red to rose, purple, or white, with a darker centre, each on very short pedicels on 3-forked corymbose panicles.

There are a vast number of varieties or more correctly seed variations, with a great range of colour in the flowers, pure white, scarlet, pink, crimson, salmon, rose, purple &c., with intermediate shades and mixtures, being represented, and nearly all obtainable from a packet of mixed seeds. Most of the flowers are rounded in shape, but there are forms in which the petals are beautifully cut and fringed, some having the central tooth of the petal greatly prolonged, thus forming a star as in the variety *cuspidata*. The double-flowered forms are an interesting race which produce masses of double or semi-double flowers, white and scarlet. Some varieties are also much dwarfer than others, the range being from about 9 to 24 in. in height.

Culture &c. as above. *P. Drummondi* and its numerous varieties are easily raised from seeds sown about the first week of March in shallow pans or boxes in light, rich soil in gentle heat and moisture. The seedlings in due course are pricked into similar boxes and after a few days are gradually given more air and light to make them sturdy. When the plants are 3–4 in. high the tip of the shoot may be pinched out. This will induce the latent buds in the axils of the lower leaves to develop into shoots, and by this means fine bushy plants full of blossom can be obtained. By the end of May the plants can be put into the open border and may be used in a variety of ways such as forming carpets for taller plants like Standard Roses, in groups by themselves, in patches in the border &c. If there is no convenience for raising the plants under glass, the seeds sown in April and May in the open border, or wherever the plants are intended to bloom, will do equally well, thinning the seedlings out to about 6 in. apart, and pinching the tops out.

P. glaberrima.—A native of the United States from Ohio to Florida, 1–2 ft. high, with slender erect stems, and more or less linear lance-shaped leaves, bright green and glossy above, often with revolute margins. Flowers in July, red, in corymbose few-flowered panicles.

Culture &c. as above. This species flourishes in ordinary soil. It may be increased by cuttings or division.

P. maculata (*P. latifolia; P. longiflora; P. penduliflora*).—A native of the United States (Pennsylvania, Iowa, and Florida) with erect, almost simple stems, about 2 ft. high and spotted with purple. Lower leaves lance-shaped, upper ones ovate, heart-shaped at the base, rather thick, smooth or roughish. Flowers in July, purple in the type, in oblong or pyramidal panicles, sweet-scented. The variety *suaveolens* or *candida* has pure white flowers, and unspotted stems; *pyramidalis* has a more pyramidal inflorescence than the type. The garden forms known under the name of *decussata* are doubtless hybrids between forms of *P. maculata* and *P. paniculata*, and have become so intermixed that it is impossible to place them under either species.

Culture &c. as above.

P. ovata (*P. triflora*).—An erect growing N. American perennial about 1 ft. high, with more or less smooth but never clammy stems, bearing ovate acute and rather fleshy leaves below, and ovate oblong ones above. Flowers in spring, reddish-purple, in small terminal crowded cymes, the petals being wavy and retuse on the margins. *P. Carolina* is a taller-growing variety about 2 ft. high, with ovate, lance-shaped leaves, sometimes heart-shaped at the base, and pinkish or purple flowers, about 1 in. across, in early summer.

Culture &c. as above. This plant grows well in borders in good soil. Increased by cuttings and division of the roots.

P. paniculata (*P. cordata; P. corymbosa; P. scabra; P. undulata*).—A showy species 3–4 ft. high, native of the United States, with smooth, roughish, or hairy erect stems. Leaves oblong- or ovate-lance-shaped, tapering at the base, or the uppermost more or less heart-shaped. Flowers in August, sweet-scented, varying from pinkish-purple to white in large conical corymbose panicles. Corolla lobes entire, rounded; calyx teeth bristly or awl-shaped. The variety *acuminata* has the stems and under side of the broader and more pointed leaves hairy.

What are known as the 'late-flowering or autumn' Phloxes have been chiefly derived from the intermixing of the forms of *P. paniculata* and *P. maculata*, and are known more commonly in gardens as *P. decussata*.

Culture &c. as above.

P. pilosa.—A handsome species with erect slender stems, 1–2 ft. high, native of Carolina. Leaves linear or lance-shaped, hairy, or downy, sometimes smooth. Flowers from May to August, ½–¾ in. across, pink, purple, rose, or occasionally white, in nearly flat sessile clusters; corolla lobes ovate, entire. This species is very rare. The true plant resembles *P. Drummondi* and will be found figured at tab. 1307 of the 'Botanical Magazine.'

Culture &c. as above.

P. procumbens.—A straggling tufted N. American perennial 4–5 in. high with small linear lance-shaped leaves borne on slightly downy stems. Flowers in summer, about ¾ in. across, lilac with violet marks near the eye, in clusters of 3 or 4 blooms on the upper part of the stems.

Culture &c. as above. This is supposed to be a natural hybrid between *P. amœna* and *P. subulata*. It is useful for the front of the rockery or mixed border in sandy loam. Increased by division.

P. reptans (*P. crassifolia; P. stolonifera; P. verna*).—A pretty dwarf creeping, stolon-bearing, downy perennial, native of the Alleghany Mountains, with obovate spoon-shaped leaves at the base of the stems, and lance-shaped ones higher up. Flowers in spring, about 1 in. across, deep rose-purple or violet, in few-flowered corymbs.

Culture &c. as above. May be grown in the rockery, edges of borders, shrubberies &c., in masses for effect, in peaty or light garden soil. Increased by division.

P. Stellaria.—A dark, wiry-stemmed species forming a dense mass about 18 in. high, with leaves 1–2 in. long. Flowers in June, white, more than 1 in. across, borne in great profusion. A very free-flowering Phlox known in gardens as *P. lilacina* somewhat resembles *P. Stellaria* in habit, but it is supposed to be a seedling form of *P. subulata*. It has lilac-purple flowers, and is an excellent rockery plant.

Culture &c. as above. Treat like *P. reptans*.

P. subulata (*Ground* or *Moss Pink*). A pretty N. American (New York to Florida) perennial with creeping tufted stems densely clothed with narrow moss-like leaves ¼–½ in. long, awl-shaped or lanceolate, fringed at the edges and downy. Flowers in great profusion in April and May, pinkish-purple (sometimes white) with a darker centre, in few-flowered corymbs; corolla-lobes wedge-shaped, notched, rarely entire. The variety *setacea* has longer and more distant leaves on its trailing stems, and smaller rosy-pink flowers with delicate markings at the mouth of the slender tube; a sub-variety *violacea* is much looser in growth, with flowers almost crimson in colour. The white-flowered form of *P. subulata* is grown under three different names—*aristata*, *Nelsoni*, and *nivalis*—the latter being most appropriate. The variety *frondosa* is distinct, having lilac-rose flowers and a vigorous habit.

Other desirable forms of *P. subulata* are *aldboroughensis*, fine rose; *atropurpurea*, purple rose and crimson; *G. F. Wilson*, beautiful mauve; *grandiflora*, pink with a crimson blotch; *pallida*, rose shaded lilac; *Vivid*, bright rose with a carmine centre.

Culture &c. as above. Requires similar treatment to *P. reptans*.

P. suffruticosa.—A fine perennial 1–2 ft. high, native of the S. United States, and closely related to *P. glaberrima*. Upper leaves broadly lance-shaped, stiffish, slightly hairy or smoothish. Flowers in April, rosy, in clustered, few-flowered corymbose panicles. Corolla-lobes ovate, entire. The variety *carnea* has smooth stems and leaves, and flesh-coloured flowers. From this species the numerous early-flowering garden Phloxes have been obtained.

Culture &c. as above.

GARDEN PHLOXES.—Under this heading are included the groups commonly known as the *decussata* or tall late-flowering Phloxes, and the *suffruticosa* or bushy early-flowering Phloxes. The *decussata* group has been obtained by numerous crosses and blendings of the best varieties of *P. paniculata* and *P. maculata*, and they have now reached such a stage that they form quite a class by themselves from a garden point of view, although in a state of anarchy from the botanical standpoint. A curious feature of garden Phloxes is that it is possible to foretell whether the flowers will be white or deeply coloured from the colour of the stems. Light or pale green stems and leaves usually indicate white or pale flowers, while deep green stems and leaves suffused with purple or red indicate rosy, purple, and other shades according to intensity. This is also a peculiarity of the Snapdragon and Pentstemon. The following is a list of the best kinds grown:—

P. suffruticosa Varieties

These are all very free bloomers, with large trusses of flowers in June and July. In height they range from 2 to 2½ ft. In the south of England and on warm hot soils these early-flowering Phloxes must be grown in partial shade, as they are not able to withstand excessive heat so well as the later-flowering varieties unless the soil is naturally cool and retentive, such as a stiff loam. For general culture and propagation see above, p. 659.

Pure White

Henri Joclet, *Her Majesty*, *Lady Napier*, *Madame Verdier*, *White Swan.*

White, with a Pink, Rose or Purple Eye

Circle, *Countess of Home*, *Cozie Glen*, *Edith*, *Empress*, *Forerunner*, *Forward*, *Harrisonii*, *J. C. Duke*, *Lady Lucy Dundas*, *Little Beauty*, *Miss Annie Johnson*, *Miss Cook*, *Miss Lingard*, *Mrs. Austin*, *Mrs. Baillie*, *Mrs. Gibson Black*, *Mrs. Greenless*, *Mrs. Hunter*, *Mrs. J. Ross*, *Mrs. James Watt*, *Mrs. Stewart*, *Mrs. Wilson*, *Nesida*, *Oberon*, *Snowdon*, *Vivida.*

White, flushed with Rose, Lilac &c.

Clouded Gem, *Miss Martin*, *Miss Minnie*, *Mrs. B. Dunbar*, *Mrs. Dalrymple*, *Mrs. Duncan*, *Mrs. Hardy*, *Mrs. W. Richards*, *Netty Stewart*, *Surprise*, *Thomas C. Glover*, *Thomas Crimes.*

Purple, Mauve, and Lilac Shades

Allen McLean, *Archibald McKeith*, *Burns*, *Dodridge*, *Floreal*, *Gem*, *George Goodall*, *King of Purples*, *Lady Musgrave*, *Max Kolb*, *Mrs. Craven*, *Purple Emperor*, *St. Blaise*, *Syren*, *Venus*, *W. W. Platt*, *Walter Gray.*

Pink, Rose, Carmine &c.

A. McKinnon, *Beacon*, *Charles Downie*, *Madame Ritchie*, *Madame Verdier*, *Mrs. Miller*, *Ninon*, *Othello.* *Rev. Dr. Hornby*, *Sunrise*, *Vulcan.*

P. decussata (*P. paniculata varieties* × *P. maculata varieties*)

A great advance has been made during the last few years in this beautiful and useful family of hardy plants, the result being larger and bolder trusses, with individual flowers twice and thrice the size of those of the older kinds. During August and September these beautiful Phloxes are among the most decorative of garden plants. They are popularly known under the name of *P. decussata*, but as explained above this name has been given by gardeners to the hybrid forms which have resulted from crossing *P. paniculata* with *P. maculata*. Most of the varieties range from 1½ to 2½ ft. in height.

White Varieties (*those marked with an asterisk* (*) *being pure white without coloured centre*).

Amazone, **Avalanche*, *Bayadère*, **Berenice*, *Christina Stuart*, *Croix du Sud*, **Diadem*, *Faust*, *Flocon de Neige*, *Géant des Batailles*, *Gen. Bréart*, *Henri Mürger*, *Hon. Mrs. Vernon*, **Jeanne d'Arc*, *Jenny Grieve*, *Lady Herbert Morrell*, *La Fille de l'Air*, **La Neige*, **Lawrence*, *Leonardo da Vinci*, *Longchamps*, **Louisa Schwartz*, *Lucy La Comtesse de Turenne*, *Madame Antoine Denis*, *M. Bouquet de la Cyr*, **Niphetos*, **Panama*, *Peerless*, *Perle*, *Protée*, **Pureté*, **Sappho*, *Sellier*, **Sylphide*, **Themis*, **Venus*.

Soft Pink and Rose Varieties

Beatrice, *Belvedere*, *Colibri*, *De Jussieu*, *Epopée*, *Fanfluche*, *Grévin*, *Jourdan*, *Le Siècle*, *Le Soleil*, *Leonnec*, *Marquis de Breteuil*, *Massenet*, *Michael Cervantes*, *Mrs. J. Landall*, *Mrs. Standring*, *P. Bonnetain*, *Pantheon*, *Rachel*, *Sheriff Ivory*, *Souvenir d'Emile Liebig*, *William Robinson*.

Salmon and Scarlet Varieties

Amabilis, *Aurore*, *Aurore Boréale*, *Boule de Feu*, *Burnouf*, *Coquelicot*, *Eclatant*, *Embrasement*, *Etna*, *Flambeau*, *George Smith*, *Henry Regnault*, *J. K. Lord*, *Jocelyn*, *Laniboire*, *Liberté*, *Manon*, *Molière*, *Mrs. Brooke*, *Mrs. Kinghorn*, *Pantheon*, *Pêcheur d'Islande*, *Regulus*, *Roi des Roses*, *Solon*, *Tempête*, *Toreador*

Rose and Crimson Varieties

Abondance, *Aquilon*, *Coccinea*, *Concours*, *Crœsus*, *Gen. Brice*, *Harmonie*, *Jean Lamour*, *Major Houston*, *Parachute*, *Pont-Biquet*, *Quantock*, *Roxelaine*, *Schliemann*, *Tourbillon*.

Purple Varieties

Asteroide, *Cœur de Lion*, *Congress*, *Corneville*, *Dutreuil de Rhins*, *Eclaireur*, *Floreal*, *Gracieux*, *Inaudi*, *Le Vengeur*, *Ouragon*, *Robur*, *Sesostris*, *Wm. Muir*.

Soft Blue and delicate Lilac Varieties

Cendrillon, *Erinnye*, *Esclarmonde*, *Eugénie Danzanvilliers*, *Javanaise*, *Joconde*, *Leo Delibes*, *Lucie Baltet*, *Oriental*, *Paul Bert*, *Richepin*.

COLLOMIA.—A genus with about a dozen species of annual (rarely biennial) herbs, having alternate—or at the base opposite—entire, cut, or pinnately dissected leaves. Flowers often red, orange, or white, in terminal cymes, the dense heads having an involucre of leafy bracts. Calyx bell-shaped, with 5 acute, narrow, entire segments. Corolla salver-shaped or somewhat funnel-shaped, with a long, slender tube, and oblong or obovate lobes. Stamens 5, often protruding. Capsule obovoid, truncate; cells 1–2-seeded.

Culture and Propagation.—Collomias grow well in ordinary garden soil and if placed in warm sheltered spots will probably appear year after year from self-sown seeds, and flower early. Seeds may be sown in the first place in April, where the plants are to bloom, the seedlings being thinned out to 2–3 in. apart.

C. coccinea (*C. Cavanillesi*). — A pretty Chilian annual, with somewhat downy, clammy stems, 1–1½ ft. high, and lance-shaped linear or ovate leaves, upper ones quite entire, or deeply 2-4-toothed at the apex. Flowers from June to October, deep red.

Culture &c. as above. Seeds sown in autumn, in cold frames, will produce plants for pot-culture in conservatories.

C. grandiflora.—A Californian species, 1½–2 ft. high, with erect, branching stems, rather downy at the top. Leaves oblong, lance-shaped, entire, shining, fringed with glands. Flowers from June to October, of a distinct reddish-yellow colour, and borne in dense rounded, clammy heads.

Culture &c. as above.

C. heterophylla.—A native of N.W. America, 1-1½ ft. high, with alternate stalked, deeply and twice pinnately cut leaves, having lance-shaped acute, downy segments. Flowers in summer, purplish, few, in sessile heads.

Culture &c. as above.

C. linearis. — A native of the same region and about the same height as the preceding. Leaves varying from linear to broadly lance-shaped, the shorter ones almost ovate, waved, entire. Flowers from May to July, yellowish-brown, in dense terminal heads, surrounded by a leafy involucre.

Culture &c. as above.

GILIA.—A genus containing about 65 species of annual rarely perennial herbs, various in habit and inflorescence. Calyx bell-shaped, or tubular, with entire or cut segments. Corolla salver-, funnel-, or bell-shaped, or rotate. Stamens 5, sometimes protruding. Capsule ovoid oblong or cylindrical 3-valved, many-seeded.

Culture and Propagation. — Gilias flourish in light soil enriched with well-rotted manure. They should be grown in masses to produce an effect, and are useful for beds by themselves, or for edgings to borders &c. Seeds may be sown in April, where the plants are to bloom; or in cold frames in autumn as soon as ripe to secure larger plants to flower earlier the following year. In a cut state the flowers last a long time in water, and are therefore useful for room decoration.

The genus *Leptosiphon* is now included with Gilia, and the many pretty hybrids known under that name may be grown as above recommended. A packet of mixed seeds will probably yield a very fine assortment of colours such as yellow, orange, red, purple, rose, violet, and intermediate shades and blendings.

G. achilleæfolia. — A Californian annual, about 1 ft. high, with leaves twice or thrice pinnately cut into linear awl-shaped segments. Flowers in August, purple-blue, in many-flowered capitate corymbs, on long stalks. There are varieties with white and red flowers.

Culture &c. as above.

G. androsacea (*Leptosiphon parviflorus rosaceus*). — A pretty Californian species, 9-12 in. high, with narrow opposite palmately cut leaves. Flowers in August, lilac, pink, or whitish, with a dark or yellow throat. The variety *rosacea* has rose-red flowers, and *albus* has white ones.

Culture &c. as above.

G. Brandegei. — A perennial species, 9-12 in. high, native of Colorado, with leaves pinnately cut into numerous small leaflets. Flowers in summer, golden-yellow, funnel-shaped, several in a short, racemose, leafy cluster.

Culture &c. as above.

G. capitata. — A native of N.W. America 1-2 ft. high, with leaves twice pinnately cut into linear segments. Flowers in summer, blue, without stalks, in dense heads. There is also a white-flowered variety.

Culture &c. as above.

G. coronopifolia (*Ipomopsis elegans*). A beautiful annual 9-18 in. high, with leaves pinnately cut into loose, thread-like, pointed segments. Flowers in June, scarlet, 3-4 together, in the axils of the upper leaves, the middle one opening first. Corolla salver-shaped, less than 1 in. across, with a tube about 1 in. long, and a calyx with 5 long awl-shaped segments. Stamens protruding.

A splendid plant for cutting. The scarlet flowers, if closed for the want of water for 2 or 3 days, will open again in fresh water if not too far gone.

Culture &c. as above.

G. densiflora (*Leptosiphon densiflorus*). — A Californian annual, with somewhat rigid leaves, cut into thread-like divisions. Flowers in June, lilac or whitish, slightly if at all protruding beyond the calyx. There is a white-flowered variety, and also one called *nanus*, which is dwarfer and more compact in habit than the type, and well suited for edgings &c.

Culture &c. as above.

G. dianthoides (*Fenzlia dianthiflora*). A showy little Californian annual, 2-5 in. high, with narrow, linear leaves. Flowers in July, lilac or purple, usually with a darker or yellowish throat. There is also a form with white flowers.

Culture &c. as above. This species does well sown in autumn, and makes a good ground carpeting.

G. inconspicua.—A native of North America 9–12 in. high. Leaves mostly pinnately parted, or twice pinnately cut below, with short, mucronate, tailed lobes. Flowers in August, violet or purple, narrowly funnel-shaped, somewhat crowded or in loose panicles.

Culture &c. as above.

G. laciniata.—A Chilian annual 6–12 in. high. Leaves pinnately cut into narrow oblong sinuate segments. Flowers in July, purplish, 3–6, clustered together in the leaf axils.

Culture &c. as above.

G. liniflora.—A native of California, about 1 ft. high, with lower leaves sessile and palmately cut. Flowers in summer, white, solitary, on long stalks.

Culture &c. as above.

G. micrantha (*Leptosiphon roseus*). A Californian annual, about 9 in. high, more or less covered with longish, weak hairs. Leaves 5–7-parted, with linear acute segments. Flowers produced in great abundance in summer, rosy, with a slender tube about 1½ in. long. The variety *aurea* has golden-yellow flowers.

Culture &c. as above.

G. multicaulis.—A native of California, about 1 ft. high. Leaves smoothish, cut into linear segments. Flowers in summer, blue, 3–10 in a corymb, on very long stalks.

Culture &c. as above.

G. tricolor. — A pretty Californian annual about 1 ft. high, with leaves twice pinnately divided into linear, awl-shaped segments. Flowers in June, in dense panicles; corolla with an orange-yellow tube and centre, and a band of deep purple between the white or pale purple margin.

There are many forms of this species, some having white, rose, and violet-coloured flowers. They can all be obtained from a packet of mixed seed. Some of the best known forms are *alba*, *atro-violacea*, *rosea*, *splendens*, and *violacea*.

Culture &c. as above.

POLEMONIUM (JACOB'S LADDER). A genus containing 8–9 species of perennial, rarely annual, tall or dwarf herbs, sometimes rather clammy, often with a thickish creeping rootstock. Leaves alternate, pinnately cut. Flowers in loosely corymbose or somewhat capitate cymes at the ends of the branches, blue, violet, or white, often showy. Calyx bell-shaped, membranous or herbaceous, scarcely ribbed, 5-cleft. Corolla shortly funnel-shaped or broadly bell-shaped or somewhat rotate with obovate lobes. Stamens 5, disc crenate. Capsule ovoid, blunt, 3-valved, 2–12 seeds in each cell.

Culture and Propagation. — Polemoniums flourish in rich deep well-drained loam, but will grow well in any good garden soil. They may be increased by dividing the 'stools' in autumn or early spring. Most of the species ripen seed freely, and new plants may be secured by sowing either in autumn or spring, and transplanting the seedlings during mild showery weather at either season when large enough. They are excellent border plants and are strikingly handsome and effective when in blossom.

P. cæruleum (*Charity; Greek Valerian; Jacob's Ladder*). — A beautiful perennial 1–3 ft. high, found in copses and near streams in parts of the British Islands, and also distributed throughout the northern hemisphere. Leaves 4–18 in. long, cut into 6–12 pairs of entire ovate or oblong lance-shaped acute leaflets, ¾–1½ in. long. Flowers in June and July, ½–1 in. across, blue or white, drooping or erect, with roundish oval petals. The variety *dissectum* has the leaves twice pinnately divided into stalked pinnatifid leaflets with linear segments. *Variegatum* has beautiful variegated leaves finely divided and graceful in outline, and white flowers. *Himalayanum* is a Himalayan variety with lilac-blue flowers, 1½ in. across, with hairy stalks and calyx. *Campanulatum* from the Caucasus has leaves pinnately divided into lance-shaped leaflets, and produces drooping bell-shaped flowers of a bright lilac blue, in the centre of which the golden-tipped stamens are very conspicuous. It likes partially shaded spots.

Culture &c. as above.

P. confertum. — A Rocky Mountain perennial about 6 in. high. Leaves pinnately divided into numerous overlapping leaflets, varying in shape from roundish ovate to linear oblong. Flowers in summer, rich blue, funnel-shaped, about ½ in. across, clustered on the ends of the stalks. This is a very fine plant when well-grown.

Culture &c. as above.

P. flavum.—A native of New Mexico, simple or branched stems 2–3 ft. high, covered on the upper parts with a loose tomentum of wool. Leaves pinnate, with multijugate, elliptic lance-shaped acute leaflets. Flowers in September, pale yellow, 1 in. across, funnel bell-shaped, in corymbose cymes. A hybrid called *flavo-cæruleum* has been obtained between this species and *P. cæruleum*.
Culture &c. as above.

P. humile (*P. Richardsoni; P. villosum*).—A beautiful Rocky Mountain species about 6 in. high, with numerous leafy downy stems. Leaves divided into bluntly ovate leaflets having a faint musk scent. Flowers in July, blue or purple, in drooping corymb-like panicles; corolla lobes ovate acutish.
Culture &c. as above.

P. mexicanum. — A North American perennial with loosely branched stems about 9 in. high, and downy pinnate leaves having ovate or oblong leaflets. Flowers in April, blue, somewhat rotate, bell-shaped, few, in corymbose clusters.
Culture &c. as above.

P. pauciflorum. — A Mexican perennial 1–1½ ft. high, with glandular downy stems, and pinnate leaves cut into narrow lance-shaped acute leaflets about 1 in. long. The flowers are about 1½–2 in. long, funnel-shaped, and of a yellow colour tinged with red on the outer surface.
Culture &c. as above.

P. pulchellum (*P. pulcherrimum*).—A native of the Rocky Mountains closely related to *P. humile*, from which it differs chiefly in having usually smooth and naked leaflets, and smaller violet or lavender-blue flowers, or nearly white in some forms.
Culture &c. as above.

P. reptans.—A North American perennial about 6 in. high, with creeping roots and smooth spreading stems. Leaves pinnate, composed of 7–11 ovate acute smooth leaflets. Flowers in April, blue, sometimes white, drooping, in loose panicled corymbs, with wedge-shaped corolla lobes.
Culture &c. as above.

COBÆA (CUPS AND SAUCERS). — A small genus of smooth climbing plants, having alternate pinnately cut leaves with terminal tendrils. Peduncles long, 1-flowered, solitary or in pairs in the leaf axils. Calyx tube short, 5-ribbed or winged, with 5 large leafy lobes. Corolla broadly bell-shaped or cylindrical, with short spreading lobes. Stamens 5, protruding. Disc fleshy, 5-lobed. Capsule ovoid or oblong leathery with 2 or more seeds in each cell.

C. scandens. — A beautiful Mexican climber having leaves composed of 3 pairs of elliptic slightly ciliated leaflets, the lower pair near the stem, and somewhat lobed on one side near the base. Flowers from May to October, large bell-shaped, with a short, dark purple tube, and short roundish spreading lobes. There is a beautiful form with variegated foliage.

Culture and Propagation.—This attractive plant is a well-known ornamental greenhouse climber, but in mild southern parts it will stand the winter if not too severe. In the course of the season it will cover a good deal of space and may be used with effect on arbours, trellises &c., or over walls. I have known plants to survive mild winters in the Thames Valley, although the stems were cut down to the ground. As it is very easily raised from seeds sown in gentle heat in spring, it may be treated as an annual in most parts of the country, being planted out at the end of May or beginning of June, and left till cut down by the frost. Any ordinary garden soil will suit it.

LXXVII. HYDROPHYLLACEÆ—Nemophila Order

An order of annual or perennial herbs with radical or alternate, rarely opposite, entire, toothed, or pinnately, rarely palmately, lobed or dissected leaves. Flowers hermaphrodite, regular, chiefly blue or white in one-sided cymes or racemes, mostly without bracts, and coiled from the apex when young. Calyx inferior, deeply divided, with 5, rarely more, lobes or segments. Corolla gamopetalous, funnel-, salver-, or bell-shaped or rotate, with 5, rarely more, imbricate or rarely twisted lobes. Stamens equal in number to the coroll lobes, sometimes protruding. Ovary superior, 1–2-celled. Styles 2, thread-like. Fruit capsular.

There are 16 genera and about 150 species mostly natives of N. America, but few are found in a cultivated state. The genus *Hydrophyllum*, which gives its name to the order, is sometimes represented in botanical gardens by *H. canadense* and *H. virginicum* grown in moist soil. The following are the most important garden plants of the order.

NEMOPHILA (Californian Bluebell).—A genus containing 7 or 8 species of dwarf branching showy annuals, nearly all natives of California. Leaves alternate or opposite, pinnately lobed and dissected. Flowers showy, blue, white, or spotted, at the ends of the branches or opposite the leaves on elongated 1-flowered stalks; rarely shortly pedicellate, in few-flowered, terminal cymes. Calyx 5-lobed and furnished between the lobes with reflexed teeth, which enlarge after the flower opens. Corolla broadly bell-shaped or rotate, with 5 broad imbricated lobes. Stamens 5. Disc sinuately 5-lobed or none. Ovary 1-celled; style more or less 2-cleft with a capitate stigma. Capsule 1–4-seeded.

Culture and Propagation.—The Nemophilas are popular annuals much valued for their bright and gay appearance in the summer. They are easily grown in ordinary good garden soil, and are well adapted for the edges of flower borders, exposed parts of the rock garden, or in small beds by themselves. The seed may be sown in April wherever the plants are required to bloom, thinning the seedlings out 6–8 in. apart. To obtain a show of blossom early in summer seed must be sown the previous August or September in cold frames and in light, free soil. The seedlings are pricked out in the usual way and may be transferred to the open border in mild weather in spring. As a rule, however, Nemophilas are usually raised from seed sown in spring either in gentle heat about March, or in the open border in April and May.

N. aurita.—An annual about 18 in. high, with pinnate hairy leaves produced at the base into 2 ear-like lobes embracing the stem. Flowers in June, purple-violet, about 1 in. across.

Culture &c. as above.

N. insignis.—A pretty dwarf, tufted, much-branched annual about 18 in. high, covered with roughish hairs, and having opposite, pinnately cut leaves with 3–4 lobes on each side, quite entire or cut. Flowers in spring and summer, sky-blue with a white centre, over 1 in. across, solitary on long stalks arising from the axils of the leaves.

There are many varieties, among which the best are *alba*, with white flowers; *marginata*, blue flowers edged with white; *purpurea rosea*, purple-rose; and *albo-variegata* or *striata*, a charming form with white flowers sometimes beautifully striped and blotched with sky-blue. Occasionally on the same plant will be produced some flowers entirely white, some entirely blue, and others white and blue combined.

N. insignis and its varieties are the best and showiest for the garden.

Culture &c. as above.

N. maculata.—A pretty annual about 6 in. high, with very hairy, pinnately cut leaves having rounded acute or bluntish lobes. Flowers in summer, over 1 in. across, white with a large violet-purple blotch at the tip of each corolla-lobe.

Culture &c. as above.

N. Menziesi (*N. atomaria*).—A handsome annual 4–8 in. high with opposite leaves pinnately cut into 5–9 almost entire lobes. Flowers in summer, white or pale blue, delicately dotted with black; corolla rotate, very hairy at the base.

Owing to its dwarf, bushy, tufted habit and great numbers of flowers this species is excellent for edges to borders or beds, or to form a carpet beneath taller growing plants like Standard Roses. There are a few fine varieties such as *alba*, white with a black centre; *cælestis*, with a sky-blue margin; *oculata*, pale blue with a blackish centre, very free-flowering. The plant known in gardens as *discoidalis* has dark purple flowers edged with white, and also with a small white 'eye' in the centre.

Culture &c. as above.

N. phacelioides. — A pretty species occasionally seen. It grows about a foot high, and has the leaves more or less pinnately cut, broadest in the middle and narrowed into a short stalk at the base. Flowers in summer, pale blue with a white centre, and a much-developed calyx.

Culture &c. as above.

PHACELIA.—A large but not very important genus from a garden point of view. It contains about 50 species of annual or perennial herbs usually roughish, downy or hairy, sometimes erect, tall and simple or branched, sometimes dwarf-spreading, very much branched or tufted. Leaves pinnately lobed or dissected, rarely undivided, large-toothed or entire. Flowers blue, violet or white, in terminal cymes, usually stalked, or reduced to a simple, one-sided, scorpioid or crosier-like raceme. Calyx lobes linear-lance-shaped or oblong, with naked sinuses. Corolla bell-shaped or somewhat rotate, rarely tubular or funnel-shaped. Stamens 5, sometimes protruding. Ovary 1-celled; style more or less 2-cleft. Capsule with wrinkled or tubercular seeds.

Culture and Propagation.—Phacelias flourish in ordinary garden soil. The annual kinds may be raised from seeds sown in April in the border where they are to bloom, or earlier in March in gentle heat, afterwards pricking out the seedlings and hardening them off in cold frames until about the end of May when they will be fit for the open border. The perennial kinds may be increased by seed in the same way, or by dividing the plants in autumn or spring.

P. bipinnatifida. — A bushy annual, 1–2 ft. high, native of Texas, covered with short, roughish hairs. Leaves alternate, stalked, pinnately divided into irregularly cut, lobed and toothed segments. Flowers profusely from July to September, bright blue when open, in crosier-like clusters resembling the *Heliotrope*; white in bud.

Culture &c. as above. Useful for borders or beds by itself. Flowers suitable for bouquets.

P. campanularia. — A pretty, much-branched Californian annual 6–8 in. high, with roundish-oblong, crenate stalked leaves. Flowers from June to September, broadly bell-shaped, deep blue, with 5 white blotches on the inner surface, one at the base of each sinus.

Culture &c. as above. Owing to its dwarf tufted compact habit this species makes an excellent edging for beds, borders &c. Its flowers, which are borne in racemes of 12–20, rival the Gentian in colour, each one being about 1 in. across. It succeeds well in rather dry and warm situations.

P. congesta.—A native of Texas 8–15 in. high, with erect flexuous stems, and pinnately cut leaves 2–4 in. long; lobes 1–4 on each side, unequal, the terminal one being larger than the others and 3-lobed. Flowers in June, blue, bell-shaped, borne in rather loose corymbose racemes.

Culture &c. as above.

P. grandiflora (*Cosmanthus grandiflorus; Eutoca speciosa*).—A tufted Californian species 3–5 ft. high, with broadly ovate leaves 1½ in. long, toothed, somewhat lobed at the base, wrinkled and covered with roughish hairs like the stems and calyx. Flowers in early summer, pale violet-purple, 1–1½ in. across, in crosier-like racemes.

Culture &c. as above.

P. divaricata (*Eutoca divaricata*).—A Californian annual with slender trailing, irregularly forked stems, and oblong or ovate entire bluntish leaves 1–3 in. long. Flowers in May, pale violet, rotate-bell-shaped in many-flowered one-sided racemes. The variety *wrangeliana* (also known as *Eutoca multiflora*) is distinguished by its 3-lobed radical leaves and its pale rosy-lilac flowers.

Culture &c. as above.

P. Parryi. — A clammy Californian annual 6–12 in. high, with stalked ovate or ovate-oblong leaves hairy on both sides. Flowers in summer, dark violet-blue, 1 in. across, nearly rotate, with rounded lobes, and borne in many-flowered cymes.

Culture &c. as above.

P. sericea (*Eutoca sericea*).—A Rocky Mountain perennial about 10 in. high, with lower leaves somewhat twice-pinnately cut, silky on both sides, the lower lobes lance-shaped, incised; upper leaves entire linear. Flowers in June, bluish-purple, somewhat bell-shaped, in densely flowered spike-like racemes.

Culture &c. as above. Increased by seeds or by division in autumn or spring. Suitable for the border or rockery.

P. tanacetifolia.—A downy Californian annual about 2 ft. high, with leaves 2–6 in. long, pinnately cut into irregularly sinuate and toothed lobes 3–7 on each side, the terminal one oblong unequally cut and toothed. Flowers from June to September, bluish-pink or pale lilac, bell-shaped, in dense-flowered crosier-like racemes, with protruding stamens. The variety *alba* differs from the type only in its whitish flowers.

Culture &c. as above. As bees have a great fondness for this species it is often grown expressly for them.

P. viscida (*Eutoca viscida*).—A compact branching Californian annual about 1 ft. high, with hairy and somewhat clammy stems, and broadly ovate coarsely toothed leaves 1½–3 in. long. Flowers from July to September, blue or purplish, about ¾ in. across, in erect many-flowered racemes 4–8 in. long opposite the leaves.

Culture &c. as above.

P. Whitlavia (*Whitlavia grandiflora*). A showy Californian annual about 2 ft. high, with deltoid or ovate-deltoid coarsely and doubly toothed, somewhat hairy leaves on long stalks. Flowers from June to September, large, rich blue, and bell-shaped, in terminal many-flowered racemes. Calyx deeply cut to the base. There is a white-flowered variety named *alba*; and a white and blue variety called *gloxinioides*.

Other species occasionally met with are *P. Menziesi* with purple flowers, *P. orcuttiana* with white flowers having a yellow centre, and *P. Franklini* with blue ones.

Culture &c. as above.

ROMANZOFFIA.—A genus containing 2 species of low tufted perennial herbs, resembling Saxifrages in habit. Leaves radical long-stalked, those of the stem very few, roundish, reniform, coarsely toothed. Flowers white, in one-sided racemes on slightly branched stems or ascending scapes. Calyx lobes 5, lance-shaped, bluntish. Corolla broadly or tubular-bell-shaped, with 5 imbricate spreading lobes. Stamens 5. Ovary ovoid 2-celled; style thread-like undivided. Capsule compressed many-seeded.

R. sitchensis (*Sitka Water Leaf*).—A pretty tufted perennial about 4 in. high, native of Sitcha and recognised by its long-stalked, roundish kidney-shaped leaves, and masses of small white flowers in April.

Culture and Propagation. — This species is suitable chiefly for open positions in the rock garden, and may be increased by seeds sown in spring or autumn in the open border or in cold frames, or by dividing the tufts at the same period. It flourishes in ordinary good garden soil that is well drained.

EMMENANTHE. — A genus of about 5 species of dwarf downy or hairy annuals, with alternate undivided sinuate or pinnately dissected leaves. Calyx segments linear. Corolla bell-shaped, with 5 short broad lobes. Stamens 5. Disc hypogynous, rather fleshy or obsolete. Styles thread-like 2-cleft, with capitate stigmas. Capsule oblong 2-valved.

E. penduliflora.—A Californian annual about 1 ft. high, with loose one-sided racemes of pale primrose-yellow flowers in summer.

Culture and Propagation.—This is the only species occasionally seen cultivated. It flourishes as a hardy annual in ordinary garden soil. Seeds may be sown in gentle heat in March, or in the open border in April.

WIGANDIA. — A genus of 3 or 4 species of tall, noble-looking, vigorous hairy plants chiefly valuable for their fine foliage. Leaves alternate, large, wrinkled, more or less toothed or lobed. Flowers borne without stalks on one side of crosier-like branches in large forked cymes, at the ends of the branches. Calyx lobes linear. Corolla tube short, broadly bell-shaped, not scaly within, with 5 large spreading lobes. Stamens 5, often protruding, the filaments being clothed with reflexed hairs below the middle. Capsule 2-valved, many-seeded.

Culture and Propagation.—Wigandias are now largely used in parks and large gardens for what is known as 'sub-tropical bedding.' They are all natives of the mountainous regions of tropical America, and their cultivation out of doors in the British Islands is consequently limited to the warmest months of the year—from June to the end of September. Grown in sheltered sunny situations and in rich sandy soil they give a noble and luxuriant effect to the garden, as they reach a height of 6–10 ft., and have enormous leaves.

Wigandias for the outdoor garden are raised from seeds sown early in March or February in heat. They germinate readily, and when the seedlings are large enough they are pricked off singly into pots in light loamy soil, and gradually given as much light and air as possible, and also a cooler atmosphere, so as to thoroughly harden them off by June, when they may be transferred to the open ground. In the autumn plants may be raised from cuttings inserted in sandy soil, and placed in bottom heat. When well rooted they may be potted and wintered in a warm greenhouse until the following June. Such plants are larger and stronger than those raised from seed and give an effect in the garden much sooner. Root cuttings may also be made in brisk bottom heat. The following kinds may all receive the same treatment.

W. macrophylla (*W. caracasana*).—A fine foliage plant about 10 ft. high, native of Caracas and the mountains of New Grenada. Leaves large, elliptic heart-shaped, acutish, hairy-tomentose, and ruddy brown above. Flowers in April (in greenhouses), lilac, on one-sided crosier-like spikes.

Culture &c. as above.

W. urens.—A Mexican species about 6 ft. high, looser in habit than *W. macrophylla* and not quite such a fine-looking plant. The stems are covered with short stinging hairs, and the large heart-shaped sinuate-lobed and toothed leaves have reddish stalks. Flowers in autumn. violet-blue, in crosier-like panicles.

Culture &c. as above.

W. Vigieri.—A vigorous quick-growing species with stems 6–8 ft. high and 2–3 in. diameter; native of Mexico. Leaves oval-elliptic cordate at the base, irregularly and sparingly toothed, about 3 ft. long, with a stalk 9–12 in. long, and over 20 in. across. Flowers in autumn. lilac-blue.

Culture &c. as above.

LXXVIII. BORAGINEÆ—Forget-Me-Not Order

An order consisting of annual or perennial herbs, shrubs or trees, rarely climbers, roughly pubescent or hairy, with round stems and no stipules, leaves alternate or very rarely opposite or whorled, entire, toothed, or very rarely lobed. Flowers in one-sided crosier-like racemes or panicles, sometimes solitary and axillary, regular or rarely oblique, hermaphrodite or very rarely polygamous by abortion. Calyx inferior with a bell-shaped, rarely cylindrical tube, or often very short or absent, usually with 5 teeth or lobes, very rarely fewer, or 6–8. Corolla gamopetalous funnel-shaped, tubular, salver- or bell-shaped or somewhat rotate, with 5, rarely 4, or 6–8 lobes. Stamens equal in number to the corolla lobes and alternate with them. Ovary superior, normally consisting of 2 carpels, sometimes entire, or laterally somewhat 4-lobed. Style simple, with a simple or 2-cleft stigma. Fruit consisting of 2–4 distinct nuts.

The order consists of nearly 70 genera and about 1200 species distributed over all parts of the world, especially in the north temperate regions.

HELIOTROPIUM (CHERRY PIE; HELIOTROPE; TURNSOLE).—A genus containing 100 to 150 species of pretty, more or less hairy herbs or bushes, with alternate, very rarely almost opposite, leaves. Flowers often small, in one-sided crosier-like or curled spikes. Calyx 5-lobed or parted. Corolla funnel- or salver-shaped, 5-lobed; stamens 5; ovary undivided, but often 4-lobed and 4-celled.

Culture and Propagation.—The Common Heliotrope or Cherry Pie (*H. peruvianum*) is a great favourite in gardens, more so formerly perhaps than at present. on account of its delightful fragrance and masses of bloom, which, however, are what may be called 'quiet' in colour. When grown out of doors from May to October they should be planted in light and rather dry soil, and are very effective in masses by themselves or forming a carpet under taller plants. Cuttings about 2 in. long readily root in spring in sandy soil placed in the greenhouse or hotbed, and during the summer hundreds of plants may be obtained from old shoots if necessary in the same way. During the winter the old plants require to be kept in a dry airy place with plenty of light and free from frost. Seeds may also be sown in early spring in sandy peat and loam, and by the end of May the seedlings will be ready for planting out.

H. anchusæfolium (*Tournefortia heliotropoides*).—A downy species native of Mexico and Argentina. It grows 9–18 in. high and has oval lance-shaped blunt and wavy leaves. The scentless flowers appear from July to September and are borne on one side of a crosier-like raceme. They are lilac-blue with a yellowish-white throat.

Culture and Propagation. — This species is somewhat hardier than the others and will survive mild winters in the open air in the mildest parts of the country. It may be raised from seeds as recommended above, and where it proves hardy outside, it may also be easily multiplied by dividing the creeping roots in spring.

H. convolvulaceum.—A showy annual 2 ft. high, native of New Mexico, with lance-shaped or nearly ovate or linear short-stalked leaves. Flowers in summer, white, sweet-scented, opening at night.

Culture &c. as above. Seeds may be sown in gentle heat in March and the seedlings planted out at the end of May or beginning of June.

H. corymbosum (*H. grandiflorum*).—A pretty Peruvian tender shrub, about 4 ft. high, with oblong lance-shaped leaves. Flowers from May to September, lilac, clustered in terminal spikes.

Culture &c. as above.

H. peruvianum.—A shrubby Peruvian species, better known in gardens than any other. Leaves oblong lance-shaped, wrinkled, crenate, hairy. Flowers in summer, pale blue or greyish-lilac, very fragrant, in terminal branched, more or less curled, one-sided spikes.

There are several fine varieties, such as *Anna Turrell, General Garfield, Roi des Noirs* and *Triomphe de Liège*. The variety known as *Volaterræ* (or Voltaire) is a fine dwarf-growing hybrid, supposed to have originated at Volterra in Italy. It has more hairy and larger leaves than the type, and deep blue flowers marked with white in the throat. It is equally fragrant, but somewhat more tender, and is probably better for the greenhouse than the open border, except in the mildest part. The *Queen of Violets* and *King of the Blacks* are also good varieties, and so is *Marguerite*, which has large trusses of deep blue flowers.

Culture &c. as above.

OMPHALODES (Navelwort).—A genus containing about 10 species of pretty weak-growing smooth or slightly hairy annual or perennial herbs. Lower leaves long-stalked, lance-shaped ovate or heart-shaped, those of the stem alternate. Flowers white or blue, slenderly stalked, rarely all in the leaf-axils; racemes loose, without bracts, or with leafy bracts at the base. Calyx 5-lobed or parted, spreading. Corolla nearly rotate with a very short tube, and 5 broad blunt spreading lobes. Stamens 5. Ovary 4-lobed developing into nutlets in fruit, furnished with a membranous inflexed wing or border, which renders them cup-shaped and distinguishes the genus from its neighbours.

Culture and Propagation.—Omphalodes are pretty rock or border plants and flourish in ordinary good garden soil. They are easily raised from seeds sown in spring in cold frames or gentle heat, the seedlings being planted out in May. Seeds may also be sown as soon as ripe, and the pricked-out seedlings may be wintered in a cold frame until the following April and May, when they will be ready for the open border. Or the old tufts of the perennial kinds may be carefully divided and replanted in spring just as growth is about to begin.

O. linifolia (*Venus's Navelwort*).—A pretty Portuguese annual 9–12 in. high, with glaucous-green leaves, wedge-shaped at the base, linear lance-shaped above. Flowers from June to August, white, sometimes tinged with blue, in bractless racemes. Also known as *Cynoglossum*.

Culture and Propagation. — Seeds may be sown in April in the open border where the plants are to bloom. In warm favourable parts of the country seeds are ripened freely and often sow themselves, giving a number of strong sturdy plants in spring.

O. Luciliæ.—A handsome perennial 4-6 in. high native of Asia Minor and the Greek mountains. Leaves glaucous-green, bluntly oblong, lower ones narrowed into a long stalk, the stem ones sessile, the uppermost of all being ovate. Flowers in summer, broadly funnel-shaped, beautiful lilac-blue, ½–¾ in. across.

Culture and Propagation. — This species flourishes in the rock garden but must have well-drained sandy soil in warm sunny positions. It is apt to suffer from stagnant moisture in winter, and also slugs. Increased by seeds or division in spring.

O. verna (*Cynoglossum Omphalodes*). *Creeping Forget-me-Not.* — A beautiful S. European perennial about 6 in. high, with creeping shoots, and stalked ovate heart-shaped or lance-shaped leaves. Flowers from March to May, blue with a white throat, less than ½ in. across, in few-flowered racemes. There is a white-flowered variety named *alba*.

Culture and Propagation. — This vernal species is suitable for the rockery or border, and may also be used for wild gardening near the edges of walks &c. It likes sandy loam, and may be increased by dividing the tufts in early autumn, so that the plants may become established before winter and be ready for flower in spring. Its underground creeping stems enable it to run over the soil rapidly.

CYNOGLOSSUM (HOUND'S TONGUE) is a closely related genus of rather coarse tall-growing biennials or perennials scarcely suitable for the flower garden, but may be utilised in rough parts, as the flowers of some are pretty. They are easily increased by seed in spring.

LINDELOFIA. — A genus containing only one species:—

L. spectabilis (*Cynoglossum longiflorum*).—A rather showy perennial 1–1½ ft. high, native of N.W. India, with long-stalked oblong pointed lower leaves, the upper ones being heart-shaped and stem-clasping. Flowers from May to August, sky-blue or purplish in drooping clusters. Calyx deeply 5-lobed. Corolla tube cylindrical, protruding in the form of scales around the throat, lobes 5, obtuse, spreading. Stamens 5, protruding. Ovary distinctly 4-lobed. Nutlets 4. The plant known in gardens as *L. longifolia* is the same as this, although it has been spoken of as if it were a distinct species.

Culture and Propagation. — This species thrives in sandy well-drained loam, and may be grown in the border in sunny places. A warm chalky soil also suits it perfectly, but it is almost sure to fail in a cold wet one. It may be increased by seeds sown in spring, but the seedlings will not flower until the following year. The old-established plants may also be divided in autumn.

MYOSOTIDIUM (ANTARCTIC or NEW ZEALAND FORGET-ME-NOT). — This genus contains only one species:—

M. nobile. — A beautiful herbaceous perennial about 1½ ft. high, native of the Chatham Islands, with large fleshy roundish heart-shaped shining plaited leaves on long deeply channelled stalks. Flowers in spring, salver-shaped or rotate, about ½ in. across, beautiful rich blue with a white margin, borne in dense corymbose cymes at the end of a leafy stalk about 2 ft. high. There is also a form with white flowers.

Although introduced more than 40 years ago to cultivation, this fine plant still defies most gardeners to grow and flower it successfully. Here and there it has been grown well for a short period, after which it has relapsed as it were into a sulky humour, refusing to grow except in a half-hearted kind of way. Although a true perennial with a thickish rootstock, it can be grown out of doors only in the mildest parts of the country. In less favoured spots it is grown in a greenhouse except during the summer months.

Culture and Propagation. — It is easily raised from seeds, especially if the latter are fairly fresh. A very sandy loam, with a little peat and leaf mould, seems to be the most suitable soil for it, and thorough drainage is also essential. With the very best treatment under glass in cold frames or greenhouses, the strongest plants may bloom about 18 months after the seeds have been sown, and if in good condition cannot fail to excite admiration. After flowering the plants may be kept in a cool light and airy place, so as to recover from the strain. Watering must be carefully regulated and given only when the plant is really in need of it. The soil in a sodden condition soon proves injurious if not fatal.

ERITRICHIUM.—A genus containing about 70 species of annual or perennial tufted, spreading, or creeping herbs. Leaves alternate, or in a few species opposite, often narrow. Calyx deeply 5-lobed. Corolla tube short, or rarely longer than the calyx, the throat often crowned with 5 small scales; lobes 5, imbricate, obtuse, spreading. Stamens 5. Ovary 4-lobed. Nutlets 4, or fewer by abortion.

E. barbigerum.—A pretty Californian annual clothed with long spreading hairs, and having lance-shaped leaves. Flowers in summer and autumn, white, small, like those of the Forget-me-not, in crosier-like cymes.

Culture and Propagation.—Seeds of this species may be sown in patches in the rockery in April where the plants are to bloom, afterwards thinning the seedlings out.

E. nanum. — A lovely dwarf tufted alpine, 2–3 in. high, with linear obovate leaves covered with long silky-white hairs, the lower leaves forming dense rosettes above the withered and persistent foliage of previous years. Flowers in summer, bright sky-blue, with a yellowish centre, like those of *Myosotis alpestris*, but larger, and appearing just above the leaves.

Culture and Propagation. — This species is the one most generally grown. It flourishes in fibrous loam and peat in sunny exposed parts of the rockery, where it may be propped up by pieces of limestone or sandstone so as to keep the silky leaves off the wet soil. While requiring abundance of water, it must not, however, be grown in badly drained soil. In wet cold winters it is well to protect it with a sheet of glass as the leaves retain moisture longer than is good for them during that period. Plants may be raised from seeds sown in spring in gentle heat, or by division of the tufts in early spring.

E. nothofulvum.—This is a Californian annual very much like the common Forget-me-not in appearance. It produces masses of white sweet-scented flowers.

Culture &c. as for *E. strictum.*

E. strictum. — A rather pretty little Himalayan annual 9–12 in. high, with tufts of leaves resembling those of the Forget-me-not. The stems are very much branched, and end in long racemes of small bright blue flowers which last for a considerable period in summer.

Culture and Propagation. — This species flourishes in any garden soil and may be used for massing like the Forget-me-nots. Seeds may be sown when ripe, or in spring in the open border where the plants are to blossom.

SYMPHYTUM (COMFREY).—A genus containing about 16 species of rather coarse-growing erect often hairy herbs, sometimes with tuberous roots. Leaves alternate or mostly radical; cauline ones sometimes decurrent, the uppermost ones sometimes very close together and almost opposite. Flowers yellowish, blue, or purple, in branched cymes or simple one-sided crosier-like racemes. Calyx 5-lobed or parted. Corolla broadly tubular. widened above, with 5 scales in the throat; lobes 5, very short, erect, tooth-like, or scarcely spreading; stamens 5. Ovary distinctly 4-lobed. Nutlets 4, obliquely ovoid.

Culture and Propagation. — The species described below flourish in almost any soil or situation and are chiefly useful for naturalising in open sunny grassy places or banks, or even under trees where there is plenty of light and air. They are easily increased by seeds sown in the open ground or in cold frames when ripe, or in spring. The seedlings may be transplanted in showery weather. The plants may also be increased by division of the rootstocks in early autumn or in spring.

S. asperrimum (*Prickly Comfrey; Trottles*).—A vigorous Caucasian perennial 4–6 ft. high, clothed with short sharp prickles, and having broad, very rough and hairy, ovate heart-shaped leaves tapering to a point. Flowers in summer, red in bud, blue after opening, bell-shaped, downy outside.

This rampant grower is excellent for the rougher or wilder parts of the garden and may be increased from seeds or by division. The variety *aureo-variegatum* has the leaves bordered with yellow.

Culture &c. as above.

S. caucasicum. — A fine Caucasian species about 3 ft. high, with ovate lance-shaped hairy leaves, the lower ones narrowed into long stalks, the upper ones nearly opposite and shortly decurrent at the sides of the stem. Flowers in summer, blue, bell-shaped, the corolla sometimes 3 times longer than the bluntly

5-toothed calyx. May be used in the same way as *S. asperrimum.*

Culture &c. as above.

S. officinale.—This well-known British plant is variously known as Alum, Black Root, Common Comfrey, Knitback &c. It grows 1–3 ft. high, and has ovate roughish, alternate, oval, lance-shaped leaves, 4–8 in. long, those of the stem being decurrent. Flowers in May and June, yellowish white or purple, tubular, about 1 in. long, in crosier-like cymes. The variety *album* has white flowers; *bohemicum* from Bohemia has red or reddish-purple flowers, and grows only about 1–1½ ft. high; *luteo-marginatum*, as the name indicates, has the leaves margined with yellow; and *patens* is recognised by its purple flowers.

Culture &c. as above.

BORAGO (BORAGE).—A genus of erect annual or perennial herbs with alternate leaves and rather long-stalked blue flowers in loose cymes. Calyx with 5 linear segments. Corolla with a short tube, rotate or widely spreading bell-shaped, often with scales or bosses at the throat, 5-lobed. Stamens 5, protruding or enclosed. Ovary distinctly 4-lobed. Nutlets 4, ovoid or oblong.

Culture and Propagation. — The Borages flourish in ordinary soil and are useful for naturalising in poor dry parts of the garden. They may be increased by dividing the rootstocks in spring; by putting cuttings of the shoots in sandy soil in a cold frame in summer and autumn; or from seeds sown in fairly good soil from March to May, the seedlings being thinned out to a foot or 18 in. apart.

B. laxiflora. — A decumbent hairy Corsican species with oblong roughish leaves in rosettes at the base, the stem ones half-clasping. Flowers from May to August, pale blue, in drooping racemes.

Culture &c. as above. It grows freely on sandy soil in sunny situations.

B. longifolia.—A native of Numidia, about 1 ft. high. Lower leaves linear lance-shaped, roughish and downy beneath, upper ones half stem-clasping. Flowers in July and August, blue, with ovate acute spreading segments, and borne in terminal bracteate panicles.

Culture &c. as above.

B. officinalis (*Common Borage*). — A British species 1–2 ft. high, with lower leaves obovate, narrowed at the base; stem leaves oblong, sessile, rather lobed at the base. Flowers from June to September, blue, purple or white, with ovate-acute spreading segments, alternating with the hairy lance-shaped lobes of the calyx.

This is the species used for flavouring drinks, and is often found in waste spots flowering profusely.

Culture &c. as above.

B. orientalis. — A vigorous Turkish species 8–15 in. high, with thick blackish creeping roots and heart-shaped hairy leaves, nearly all radical. Flowers in early spring, bluish, with ovate, blunt, reflexed lobes, and borne in panicled clusters. Stamens greatly protruding.

Culture &c. as above. May be naturalised in dry, rough places, banks &c., in shady or exposed sunny situations.

TRACHYSTEMON. — A genus having only a couple of species of erect branching hairy perennials, often with large long-stalked radical leaves, those of the stems being fewer, smaller, and alternate. The flowers have a bell-shaped 5-lobed calyx, and also a corolla with a cylindrical tube, and 5 spreading or reflexed lobes. Stamens 5, much protruding. Ovary lobes 4 distinct, becoming 4 ovoid or oblong nutlets when ripe.

T. orientalis.—A strong-growing hairy perennial 3 ft. or more high, native of Asia Minor, with an attractive and elegant habit. The lower stalked leaves, which appear after the flowers, are heart-shaped, ovate acute, about 10 in. long, and 7 in. across in the widest portion. The charming violet-blue flowers appear in early spring, 70–80 in a branched truss, the corolla-lobes being reflexed and twisted at the tips, and the white stamens standing out in the centre in a cone-like tuft more than ½ in. long.

Culture and Propagation.—This plant is somewhat too vigorous for the choice flower border, but is well adapted for furnishing wilder parts of the garden. The roots spread a good deal, and send up shoots all over the surrounding surface. They should therefore be restricted if necessary with a sharp spade. The plant flourishes in ordinary soil, and is easily increased by dividing the roots in autumn. The flowers although beautiful are useless for cutting, as they do not last long.

ANCHUSA (ALKANET).—This genus contains about 30 species of more or less roughly hairy or perennial herbs, only a few of which are of garden value. Leaves alternate. Flowers in crosier-like racemes, drooping, blue, violet, or white. Calyx with 5 usually narrow lobes. Corolla tube straight, cylindrical, throat closed with hairs or scales, lobes 5 imbricate, blunt, spreading. Stamens 5. Nutlets 4, oblique or incurved.

Culture and Propagation.—Anchusas grow readily in ordinary soil in sunny situations, and are easily increased by seeds sown in spring in sandy soil, or by division of the tufts in the case of perennials in early autumn or spring.

A. capensis.—A pretty S. African biennial with simple hairy stems about 1½ ft. high, and linear-lance-shaped hairy leaves. Flowers in July, blue, in racemose panicles at the ends of the branches.

Culture &c. as above. The seeds of this rather tender species may be sown in August or September, the seedlings being wintered in a cold frame or greenhouse and planted out the following May. The seeds may also be sown in gentle heat early in spring, and the seedlings pricked out and hardened off so as to be fit for the open border in May.

A. italica (*A. azurea; A. paniculata*). A strong-growing Caucasian species 3–4 ft. high, with lance-shaped entire shining leaves, the lower ones sometimes 2 ft. long. Flowers in summer, bright blue or purple, in panicled racemes.

This is one of the best species and may be increased by seeds or division. *A. hybrida* is a biennial about 2 ft. high, similar in appearance to *A. italica*, but it has rich violet flowers in spikes 1 ft. or more long.

Culture &c. as above.

A. sempervirens.—A perennial species 1½–2 ft. high, found naturalised in parts of the British Islands. Leaves broadly ovate, lower ones stalked. Flowers in May, rich blue, with a very hairy calyx, and borne in short axillary spikes, usually leafy at the base.

There are a few other species occasionally seen, chiefly in botanical collections, but the Anchusas as a whole are not of great value as garden plants.

Culture &c. as above.

PULMONARIA (LUNGWORT).—A genus containing 4 or 5 species of hairy perennial herbs with large stalked radical leaves, and few alternate cauline ones, all usually spotted with white. Flowers pedicellate, blue or rosy-purple, the lower ones or nearly all bracteate, in terminal bifid cymes. Calyx shortly or as far as the middle 5-cleft, angular. Corolla funnel-shaped, with a cylindrical tube, 5 broad blunt spreading lobes, and 5 tufts of hair alternating with the 5 stamens. Nutlets 4.

Culture and Propagation.—Pulmonarias grow well in any ordinary soil and delight in shady places in wild or rough parts of the garden. They are chiefly increased by dividing the established clumps in early spring. Seeds, however, may be sown when ripe or in spring in the open ground in places where the plants are to blossom; or in prepared parts of the border from which the seedlings may afterwards be transplanted in mild showery weather in early autumn or spring.

P. angustifolia (*Blue Cowslip*).—A rare British species about 1 ft. high, with more or less oblong lance-shaped leaves, 6–10 in. long, often spotted with pale green and covered with soft downy hairs. Flowers from April to June, dimorphic, ¾ in. across, pink, then bright blue, in twin capitate racemes.

Culture &c. as above.

P. mollis.—A Siberian species about 9 in. high. Lower leaves more or less elliptic lance-shaped, decurrent into a broadly winged stalk, upper leaves ovate lance-shaped, half stem-clasping. Flowers in April and May, blue, corolla tube shorter than the calyx.

Culture &c. as above.

P. officinalis (*Sage of Bethlehem*).—A British and European species about 1 ft. high. Lower leaves ovate heart-shaped, upper ones ovate oblong sessile, spotted with white. Flowers in spring, at first red, afterwards violet. There is a white-flowered variety called *alba*.

Culture &c. as above.

P. saccharata.—A native of Europe about 1 ft. high. Lower leaves elliptic oval, decurrent into short stalks, upper ones stalkless ovate oblong, all spotted with white. Flowers in June, pink.

Culture &c. as above.

MERTENSIA.—A genus containing about 15 species of smooth or hairy perennial herbs with alternate, often pellucidly dotted leaves. Flowers blue or purplish, pedicellate, without bracts; racemes terminal, or cymes loosely branched, few-flowered, one-sided, sometimes paniculate. Calyx with 5 ovate-lance-shaped or linear lobes. Corolla tubular funnel-shaped, enlarged or somewhat bell-shaped at the throat, and having 5 short, blunt, spreading lobes. Stamens 5, enclosed or scarcely protruding. Nutlets 4, or fewer by abortion.

Culture and Propagation. — Mertensias are closely related to the Pulmonarias and have been a good deal mixed up with them in naming. They are, however, choicer plants for the garden, and are easily grown in ordinary soil. They may be used in the flower border, edges of shrubberies, or the dwarfer kinds in the rock-garden. They may be increased by division in early autumn, or by seeds sown in cold frames as soon as ripe, the seedlings being kept under glass protection until about the following May, when they will be sturdy enough for planting out.

M. alpina.—A charming little alpine, 6–10 in. high, native of the Rocky Mountains, with bluish-green oblong or somewhat spoon-shaped leaves. Flowers in spring and summer, pale blue, 1–3 on a stem, in drooping terminal clusters.

Culture &c. as above. A pretty rock plant.

M. dahurica (*Pulmonaria dahurica*). A graceful slender, erect growing, hairy perennial, with furrowed and angled stems, 6–12 in. high, native of Dahuria. Leaves ovate, roughish, slightly glaucous and covered with short hairs. Flowers in May and June, bright sky-blue, tubular, in panicled clusters, drooping at first, afterwards erect and elongated.

Culture &c. as above. This is best grown in sheltered nooks in the rockery where it will not be blown about by strong winds. It thrives in sandy peat and loam, and may be increased by division.

M. lanceolata. — A beautiful Rocky Mountain perennial, 6–12 in. high, with slender erect simple stems. Leaves stalkless, chiefly cauline, linear-oblong or spoon-shaped, the radical ones often broader, smoothish above, with fringed margins. Flowers in May, drooping, pale or dark blue, bell-shaped, shortly 5-lobed, with a cylindric tube.

Culture &c. as above.

M. maritima (*Pulmonaria maritima*). *Oyster Plant.*—A British seaside perennial with decumbent leafy much-branched stems, 1–2 ft. long, and ovate or oblong acutish leaves 1–3 in. long, the lower ones stalked, the upper sessile. Flowers in May and June, ¼ in. across, at first pink, then blue, borne in erect terminal corymbose racemes.

Culture &c. as above. Flourishes in light deep sandy soil in open sunny parts of the rock garden, where its fleshy flower stems may ramble about. Increased by seeds sown as soon as ripe. As slugs are very fond of it, a sharp look out must be kept for them.

M. oblongifolia.—A pretty N. American species 6–9 in. high, with deep green oblong fleshy leaves and clustered heads of brilliant blue flowers in summer.

Culture &c. as above.

M. paniculata (*Pulmonaria paniculata*).—A roughish and more or less hairy N. American perennial 1–2 ft. high, with rather ovate lance-shaped tapering ribbed leaves, thin in texture. Flowers in July, purple-blue, funnel-shaped, 3–4 times longer than the lance-shaped linear divisions of the calyx.

Culture &c. as above. Increased by division.

M. sibirica (*Pulmonaria sibirica*).—A pretty species 6–18 in. high, native of E. Asia and N. America. Leaves smooth, rather fleshy, lower ones heart-shaped, roundish or broadly elliptic, upper ones ovate acute. Flowers from May to July, purple-blue, in elongated, forked racemes, with a flower in the forks. The variety *alba* is recognised by its white flowers.

Culture &c. as above. Increased by division.

M. virginica (*M. pulmonarioides*). *Pulmonaria virginica*).—*Virginian Cowslip.*—A graceful perennial 1–2 ft. high, native of Virginia, and perhaps the best of all. Leaves lance-shaped ovate, lower ones 4–6 in. long, shortly stalked, upper ones gradually diminishing in size, and without stalks. Flowers from April to June, beautiful purple-blue, tubular, or cup-like, about 1 in. long, in gracefully drooping or nodding clusters in the axils of the upper leaves and at the ends of shoots. The variety *rubra* is a charming plant with beautiful soft pink blossoms.

Culture and Propagation.—The Virginian Cowslip is best grown in sheltered nooks in moist, sandy, peaty, and well-drained soil, in lower parts of the rock garden, the edges of borders &c. Increased by division in autumn, and by seeds sown as soon as ripe.

MYOSOTIS (FORGET-ME-NOT).—A genus of annual or perennial hairy or rarely smooth herbs, with alternate leaves. Flowers in crosier-like cymes or racemes, with or without bracts, blue, rosy, or white. Calyx shortly or deeply 5-cleft. Corolla tube short, closed at the throat more or less with 5 notched scales, or naked; lobes 5. Stamens 5, enclosed or protruding. Nutlets 4, distinct, ovoid.

Culture and Propagation.—More than 40 species of Forget-me-nots have been described by various authors, but many of them are confused with one another. The kinds described below are among the best for garden purposes. They are easily grown in moist rich soil and rather shady places, and may be increased by seeds sown in March and April on a warm border. The seeds may also be sown as soon as ripe in prepared spots, and the seedlings afterwards pricked out into their flowering quarters not later than the end of September or middle of October, so that they may secure a good hold of the soil before winter sets in. Plants obtained in this way flower freely in spring and make fine bushy clumps. The perennial kinds may also be multiplied by dividing the tufts in early spring, or cuttings may be inserted in moist sandy soil, under a handlight or cold frame during the summer in shaded spots.

M. alpestris (*M. rupicola*).—A pretty British alpine, 2–3 in. high, closely related to *M. sylvatica.* Leaves dark green, hairy, sessile, oblong lance-shaped, 1½–2 in. long, in dense tufts. Flowers in early summer, ⅛ in. across, bright blue, with a small yellowish eye, fragrant towards evening. The variety *elegantissima* is a pretty dwarf free-flowering plant with white, rose, and blue flowers. There are other dwarf forms with white and rosy flowers, and one with yellowish leaves and deep blue flowers.

Stricta and *Stricta cœlestina* are unique varieties, the branches of which grow upright, forming a regular pillar or column, studded with sky-blue flowers. Useful for borders or pot culture. Other good varieties are *Victoria* and *Distinction*, the latter 5–7 in. high, having a rounded, bushy habit and bright sky-blue flowers which appear 8–10 weeks after the seeds have been sown. As a pot plant it will flower in greenhouses during the winter from autumn-sown seeds.

Culture and Propagation.—May be grown in the rockery, the edges of the flower border, in sandy moist soil, in partially shaded places. The typical plant grows on moist rocks in the north of England, at elevations of 2400–4000 ft

M. azorica.—A charming perennial 6–10 in. high, native of the Azores. Leaves hairy, upper ones bluntly oblong, lower ones oblong spoon-shaped. Flowers in summer, about ½ in. across, at first rich purple, afterwards a bright indigo-blue, and remarkable for the absence of a differently coloured 'eye' in the centre. The variety *alba* has white flowers; and *Impératrice Elizabeth* is a seedling variation forming a little bush about 6 in. high, and studded with bluish-purple flowers.

Culture and Propagation.—*M. azorica* is somewhat tender and requires to be grown in warm sheltered parts of the rockery, in light, rich, sandy soil. It may be increased from seeds or by cuttings. The variety *Impératrice Elizabeth* is more sturdy, and makes a fine pot-plant or an ornament for shady nooks in the rockery.

M. dissitiflora.—A beautiful perennial 6–12 in. high, native of the Swiss Alps. Leaves oblong lance-shaped, tapering. Flowers very early in spring, lasting till summer, deep sky-blue, ½ in. or more across, in great profusion. This species is closely related to *M. sylvatica* but may be distinguished readily by its stalked nutlets, those of *M. sylvatica* being without stalks. It also flowers much earlier, and looks well in broad masses in the rockery or the front of borders, shrubberies, copses &c. In favourable spots it seeds freely, but may also be increased by division and cuttings.

There are several varieties, among which are *alba* with pure white flowers; *grandiflora* with very large flowers like the type, produced in great profusion in February; *perfecta*, a very large and symmetrical form; *elegantissima*, which is recognised by its tufts of leaves having an irregular white border.

Culture &c. as above.

M. palustris. — This is the True British Forget-me-not found in wet or marshy places throughout the British Islands. It is a beautiful perennial 6–12 in. high, with creeping rootstocks and stoutish, flexuous stems. Leaves 1–3 in. long, linear oblong or narrowly spoon-shaped, shining, the upper ones sessile or shortly decurrent. Flowers from May to July, ⅓–½ in. across, sky-blue, with a small yellow centre, borne in simple or forked racemes.

Culture &c. as above. This plant is well worth growing in moist parts of the rockery or border, and may be easily increased by division in early autumn. There is a white-flowered form, also one with larger flowers than the type and sure to be called *grandiflora* some day. There is one called *semperflorens* because it flowers for a much longer period than the type.

The variety *Tom Thumb* is a lovely little Forget-me-not forming tufts like the *Pearlwort* (*Sagina pilifera*), from whence spring up numerous delicate sky-blue flowers. It comes true from seeds, and flowers from May till the frost cuts the blooms down.

M. Rehsteineri.—A native of Switzerland, found near Lake Geneva, and probably a variety of the British *M. cæspitosa*. The more or less oblong spoon-shaped leaves are in dense tufts close to the ground, and the plants are studded with bright blue flowers having a small yellow centre, during April and May.

Culture &c. as above. This plant flourishes in damp parts of the rockery or border.

M. sylvatica. — A beautiful British biennial or perennial species, 1–2 ft. high, branched from the base, and bearing bluntish, oblong lance-shaped leaves, 1½–3 in. long, covered with soft hairs. Flowers from May to September, ⅓ in. across, bright blue, with a yellow throat, in solitary or forked racemes. There are several varieties, including white, rose, and striped ones; the one called *grandiflora* has blue flowers about ½ in. across; *elegantissima* is a dwarf and very free flowering form with large white, blue, or pink flowers; and *compacta aurea* has tufts of golden or yellowish leaves.

Culture and Propagation.—*M. sylvatica* is a popular plant for flower borders or beds, and sows itself freely wherever grown. The seedlings are transplanted in September and make a beautiful show of blossom the following year. After flowering the old plants may be thrown down in any waste spot to shed their seeds. These will germinate freely, and the seedlings may be transferred to beds or borders in autumn.

M. Welwitschi (*M. cintra*). — A Portuguese annual or biennial Forget-me-not about 4 in. high, with a tufted habit, and ovate lance-shaped leaves. The bright blue flowers appear in early summer, and have a yellowish-white centre.

Culture &c. as above for *M. sylvatica.*

LITHOSPERMUM (GROMWELL).—A genus containing about 40 species of biennial or perennial herbs, bushes, or rarely small shrubs, more or less hoary or hispid. Leaves alternate, usually narrow. Flowers white, yellow, bluish or violet in bracteate cymes. Calyx 5-parted or cleft with linear lobes. Corolla funnel- or salver-shaped, 5-lobed, with a straight cylindrical tube. Stamens 5. Nutlets 4, or fewer by abortion.

Culture and Propagation.—Only a few species are of garden value in rich well-drained sandy loam. They are suitable for the rock garden or the edges of borders and may be increased by cuttings during the summer inserted in cold frames; by division in early spring; or by seeds sown at the same period under glass.

L. canescens (*Batschia canescens*).—A N. American herbaceous perennial with bluntly oblong leaves emarginate at the apex. Flowers in June and July, yellow, fulvous, nearly sessile.

Culture &c. as above.

L. Gastoni. — A beautiful Pyrenean species 1–1½ ft. high, with obovate lance-shaped leaves slightly rough with adpressed hairs. Flowers in summer, bright sky-blue, in clusters at the ends of the branches.

Culture &c. as above. This is suitable for the rockery or border in rich well-drained loam. Increased by seeds or division.

L. graminifolium (*Moltkia graminifolia*).—A tufted, grass-like species from N. Italy with linear acute leaves. Flowers from June to August, deep blue, drooping, in terminal clusters on wiry scapes 6–12 in. high.

Culture &c. as above. Sunny parts of the rockery in rich sandy soil.

L. hirtum (*Batschia Gmelini*). — A rare perennial about 6 in. high, native of the S. United States. Leaves linear lance-shaped, obtuse, 2–3 in. long. Flowers from May to July, orange-yellow, rather hairy outside.

Culture &c. as above. Warm sheltered nooks in the rock garden in well-drained sandy loam.

L. prostratum (*L. fruticosum*). — A beautiful S. European dwarf trailing evergreen with prostrate spreading hairy stems, woody at the base. Leaves sessile, linear lance-shaped, roughly hairy. Flowers in early summer, bright Gentian blue, about ½ in. across, with reddish-violet stripes.

Culture and Propagation.—This fine free-flowering species is well suited for the rock garden, where its trailing stems can ramble over the rocks and display to advantage the brilliant flowers. On dry, rich, sandy soils it is also an excellent border plant forming rounded masses 1 ft. or so high. It is difficult to increase except by cuttings from the previous year's growth inserted in fine sandy peat, under a bell-glass or handlight, and kept shaded and cool for a few weeks.

L. purpureo-cæruleum.—A handsome perennial with creeping stems and erect flower-stalks about 1 ft. high. It is found wild occasionally in the south of England in copses on limestone and chalk. Leaves 1½–3 in. long, nearly sessile, narrow lance-shaped, and softly hairy. Flowers in June and July, about ¾ in. across, bright bluish-purple.

Culture &c. as above. Suitable for borders, rockeries, the edges of shrubberies, copses &c. in any soil except a clayey one. Increased by seeds and division. Other British species are *L. arvense*, with creamy-white flowers, and *L. officinale*, with yellowish-white ones, and much more common than *L. purpureo-cæruleum.*

MOLTKIA.—A genus containing 6 or 7 species of more or less downy perennial herbs often tufted and sometimes woody at the base. Leaves alternate, narrow. Flowers blue or yellow, in one-sided spikes at the ends of the branches. Calyx deeply 5-cleft or parted, with linear segments. Corolla tubular, funnel-shaped, with a naked or hairy throat, and 5 obtuse erect or scarcely spreading lobes. Stamens 5, protruding. Nutlets often solitary by abortion.

Culture and Propagation.—Moltkias are closely related to the Gromwells (*Lithospermum*) and may be grown under somewhat similar conditions and treatment. They flourish in ordinary good garden soil of a rather sandy nature and fairly well exposed to the sun. The plants may be increased by seeds sown as soon as ripe in cold frames, or by means of cuttings inserted in sandy soil in cold frames or under hand-lights during the summer.

M. cærulea. — A somewhat shrubby species about 1 ft. high, native of Asia Minor. Leaves oblong lance-shaped, acute, rather silky. Flowers in April, bluish-purple, in spikes 4–6 in. long with lance-shaped bracts.

Culture &c. as above.

M. petræa (*Lithospermum petræum*). A pretty Dalmatian dwarf shrub 6–8 in. high, like a small Rosemary bush, with greyish, narrow, oblong linear leaves 1–1½ in. long. Flowers from May to July, at first pinkish-purple, afterwards rich violet-blue, about ½ in. across, in dense clusters on simple or forked racemes. This species is also known as *Lithospermum rosmarinifolium.*

Culture and Propagation. — Flourishes in deep, well-drained sandy soil in sunny sheltered parts of the rock garden. It is usually increased by cuttings inserted in summer in sandy soil in a cold frame or under handlights, and kept close and shaded for a few weeks.

A totally different plant—*Erodium petræum*—belonging to the Geranium Order (p. 284) has been confused with this species.

ARNEBIA (PROPHET or MOHAMMED'S FLOWER).—A genus containing about 12 species of pretty perennial or annual hairy herbs, erect or spreading in habit, with alternate leaves. Flowers yellow or violet, almost stalkless, in simple racemes or leafy branched cymes. Calyx

5-cleft with linear lance-shaped lobes, sometimes thickened and lobed at the base. Corolla tube slender, straight, with a naked throat; lobes 5, blunt, spreading, the sinuses often inflexed and dilated. Stamens 5, enclosed. Nutlets 4, or fewer by abortion.

A. cornuta.—A pretty bushy annual about 1½–2 ft. high, native of Turkestan, with dark green hairy lance-shaped leaves. The deep yellow flowers with a blackish-purple heart-shaped spot on each corolla-lobe appear in summer, and are borne in racemes. The black spots change to brown and finally disappear with age.

Culture and Propagation. — This remarkable annual flourishes in ordinary soil and may be raised from seeds sown in gentle heat in March or in the open border in April and May. The flowers last more than a week when cut and placed in water.

A. echioides.—A beautiful Armenian perennial 9–12 in. high or more, with sessile leaves having ciliated edges. Flowers freely during May and the summer months, bright primrose-yellow, with a conspicuous purple or blackish spot in the sinuses between the lobes of the corolla when first open, but gradually fading away, leaving the flowers at last clear yellow. Flower-spikes large, solitary, terminal, one-sided. This species has now been transferred to the genus *Macrotomia* which differs but little in structure from *Arnebia*.

Culture and Propagation.—A splendid plant for the border or rockery, flourishing in deep light moist soil, well-drained, and in somewhat shaded situations. It is usually increased by cuttings (as seeds are not always obtainable) inserted in sandy soil under a handglass and kept close and shaded for a time until fairly well-rooted.

A. Griffithi.—A pretty annual species about 9 in. high, from N. West India. It resembles *A. echioides* but has narrower leaves, and smaller flowers of a clearer and more decided yellow, and with a longer tube.

Culture and Propagation. — This species must be raised from seeds sown in gentle heat in March, the seedlings being planted out in May or June according to the mildness of the weather. For the treatment of annuals in general see p. 78.

A. macrothyrsa. — A beautiful perennial 1–1½ ft. high, native of N. Kurdistan. The leaves are 4–7 in. long, and the large yellow flowers are borne in dense trusses during the summer months.

Culture &c. as above. Increased by seeds and division.

ECHIUM (Bugloss). — A genus of about 20 species of more or less beautiful strong-growing hairy herbs or shrubs with alternate leaves, and flowers in spiked or panicled one-sided racemes recurved at the top. Calyx 5-parted with linear or lance-shaped segments sometimes united at the base. Corolla tubular, funnel-shaped, with 5 rounded unequal erect or somewhat spreading lobes. Stamens 5, often unequally protruding. Nutlets 4.

Culture and Propagation.—Echiums flourish in ordinary garden soil. The annual and biennial kinds may be raised from seeds; the perennials also, and by cuttings in sandy soil under a handlight, and the shrubby kinds by layers. Seeds may be sown in spring or autumn according to whether the plants are required to flower the same season or the following.

E. albicans. — A beautiful dwarf-growing Spanish perennial covered with hoary appressed bristly hairs. The linear-lance-shaped leaves 2–3 in. long, tapering to the base, form dense tufts, those on the stem sessile. Flowers in early summer, at first rose, afterwards violet, nearly 1 in. long, in recurved racemes on scapes 6–18 in. high.

Culture &c. as above. Increased by seeds or cuttings.

E. creticum.—A pretty hardy annual 6–18 in. high, native of S. Europe, with herbaceous, spreading, hairy stems and branches and oblong lance-shaped leaves. Flowers in July, irregular, reddish-violet, in many-flowered spikelets.

Culture &c. as above. Increased by seeds sown every year, as recommended for annuals in general at p. 78.

E. plantagineum. — A handsome annual or biennial with spindle-shaped roots and erect or ascending diffusely branched stems, 1–3 ft. high. It is found wild in Cornwall and Jersey, and in the Mediterranean region. Lower leaves 4–6 in. long, lance-shaped, stalked; upper ones linear oblong, spreading, blunt, sometimes widened at the base. Flowers from June to August, 1 in. across, dark bluish-purple, with stamens slightly protruding, and borne in spreading curved cymes 4–6 in. long.

Culture &c. as above. Increased by seeds sown annually.

E. vulgare (*Viper's Bugloss*). — A British biennial 2–4 ft. high. Lower leaves stalked, 4–8 in. long; upper ones sessile lance-shaped or oblong rounded at the base. Flowers from June to August, ¾ in. across, reddish-purple in bud, bright blue when open, rarely white, 4 stamens protruding, and borne in curved panicled cymes.

Culture &c. as above. This species flourishes in light sandy soil in the border or rough parts of the garden and may be raised from seeds sown annually when ripe or in spring.

ONOSMA (Golden Drop).—A genus containing about 70 species of more or less hairy annual, biennial, or perennial herbs or shrubs with alternate leaves. Flowers yellow, rarely white or purple, pedicellate or nearly sessile, borne in simple one-sided curved racemes or branched cymes. Calyx 5-parted. Corolla tubular, often narrowed at the base, often widened about the centre, and again contracted near the 5 very short tooth-like lobes. Stamens 5, rarely protruding. Style thread-like, protruding. Nutlets 4, or fewer by abortion.

Culture and Propagation. — These plants thrive in rich deep sandy loam which must be well drained. A little peat or leaf-mould may also be added, and during wet winters it is advisable to cover the plants with a handlight or a sheet of glass. The hairiness of the foliage retains the moisture, and in cold winters this is very injurious. They may be increased by cuttings of the basal shoots taken in summer, and inserted in moist sandy soil under a close and shaded handlight. Too much water must not be given, as the hairy leaves are liable to rot off.

O. albo-roseum.—A pretty little perennial 3–6 in. high, native of Asia Minor. It has tufts of grey-green hairy leaves, and drooping tubular white flowers about 1½ in. long, swollen near the top, and with a rosy or reddish hairy calyx, the lobes of which are about half as long as the white corolla tube.

Culture &c. as above.

O. bracteosum.—A distinct species 3–6 in. high, with hairy oblong oblanceolate leaves, 1½–2 in. long, and clusters of drooping white tubular blossoms in June, the hairy calyx segments being three-fourths as long as the corolla tube.

Culture &c. as above. This species is not yet well known but deserves to be cultivated, although it appears to be rather shy in blooming. It likes gritty well-drained soil in sheltered parts of the rockery, and should be protected with a handlight or sheet of glass in winter to keep off the heavy rains.

O. echioides.—A native of S. Europe with greyish-green oblanceolate leaves 4–5 in. long, covered with whitish adpressed hairs. Flowers in May and June, on leafy stems 6–9 in. high, bright yellow, tubular, in drooping clusters.

Culture &c. as above. As this plant is a biennial it is necessary to raise seeds regularly every year to prevent it dying out.

O. pyramidale. — A rare Himalayan species 1½–2 ft. high, covered with white hairs. Leaves in dense tufts, 10–12 in. long, narrow lance-shaped acute, the upper ones shorter and more pointed. Flowers in October, bright scarlet, fading to lilac, drooping in short curved racemes.

Culture &c. as above. Owing to the unique colour of the blossoms every effort should be made to increase this species.

O. simplicissimum.—A Siberian species about a foot high with linear leaves covered more or less with silky hairs. The pale yellow flowers are usually borne in twos at the ends of the shoots.

Culture &c. as above. Although figured many years ago in the 'Botanical Magazine,' t. 2248, this species seems to have dropped out of cultivation altogether.

O. stellulatum.—A Macedonian perennial about 6 in. high with linear oblong leaves, the lower ones somewhat spoon-shaped, the upper ones half stem-clasping. The flowers appear in early summer and vary in colour from white to yellow or pale lemon.

Culture &c. as above.

O. tauricum.—A beautiful and distinct evergreen perennial, 6–12 in. high, native of the Caucasus, with dense tufts of hairy linear lance-shaped acute leaves with revolute edges. Flowers in summer, yellow above, 1½ in. long, tubular inflated in the middle, and drooping on one-sided recurved spikes. There is a white variety, *alba*, but it is rather difficult to establish, being of a more delicate constitution.

Culture &c. as above. This species is an excellent plant for the border or rock garden in deep well-drained soil. Increased by seeds or cuttings. It is the only species generally met with outside botanical collections, but *O. echioides* is an excellent companion, and seems to be very similar, if not identical with it.

CERINTHE (Honeywort). — A small genus of smooth glaucous annual or perennial herbs with alternate leaves, those of the stem being heart-shaped or hastate-amplexicaul. Flowers yellow, often spotted with purple, in leafy terminal crosier-like cymes or racemes, at first clustered, afterwards distant. Calyx 5-parted. Corolla broadly tubular, straight or incurved, often constricted at the throat, 5-lobed. Stamens 5, sometimes slightly protruding. Ovary 2-lobed. Fruit composed of 2 distinct 2-celled nuts.

Culture and Propagation. — These plants grow readily in ordinary garden soil and (with the exception of *C. maculata*, which is a perennial) are easily raised from seeds sown in April in sunny spots on warm borders or in cold frames from which the seedlings may be transplanted in June or earlier. Those described below are all annuals except *C. maculata.*

C. aspera.—A native of S. Europe 1–2 ft. high with oblong finely toothed and ciliate leaves, roughish beneath. Flowers in July, yellow, with a brownish-purple cylindrical tube.

Culture &c. as above.

C. glabra. — A native of the Alps about 1 ft. high, with ovate lance-shaped entire leaves. Flowers in June, yellow at the base, violet at the top.

Culture &c. as above.

C. maculata.—A native of S. and E. Europe 1–1½ ft. high, with ovate heart-shaped entire smooth leaves. Flowers in June, yellow, inflated, with 5 dark purple spots on the tube.

Culture &c. as above. This perennial has fleshy roots and should be grown in dry sunny situations in well-drained soil, so that the roots will not rot through stagnant moisture.

It may be increased by division in early autumn or in spring. Seeds may also be sown in cold frames when ripe, or in the open border about April, afterwards transplanting the seedlings, or thinning them out if the plants are required to bloom where the seeds have been sown.

C. major.—A native of Switzerland about 1 ft. high. Leaves heart-shaped ovate finely toothed and ciliate, fleshy, stem-clasping, smooth above, and covered with white dots, rough beneath. Flowers in July, inflated, yellow at the base, purple on top.

Culture &c. as above.

C. minor.—A native of Central and S. Europe, 1–1½ ft. high. Leaves heart-shaped ovate entire, smooth, covered with tiny white warts above. Flowers in June, yellow, sometimes with 5 brownish spots on the tube.

Culture &c. as above.

C. retorta.—A native of Greece about 1½ ft. high. Leaves stem-clasping, rather spoon-shaped, emarginate at the apex, with a short bristle in the centre, and having small white warts on both surfaces. Flowers in July, yellow and violet, club-shaped, cylindrical, with a constricted 5-toothed mouth.

Culture &c. as above.

LXXIX. CONVOLVULACEÆ—Bindweed Order

An extensive order of herbaceous plants or shrubs (rarely trees) with weak, trailing, twining or high climbing stems. Leaves alternate, various in form, often heart-shaped, entire, sinuate-toothed, palmately or rarely pinnately lobed or dissected (absent in the Dodder, *Cuscuta*). Stipules none. Flowers in axillary or terminal racemes, or solitary, regular, hermaphrodite, or very rarely polygamous by abortion. Calyx inferior in 5 divisions; sepals often free or scarcely united at the base, much imbricated. Corolla gamopetalous, hypogynous, funnel-shaped, tubular, salver- or bell-shaped, rarely almost rotate, 5-lobed or nearly entire, plaited, convolute or twisted in bud. Stamens 5, inserted in the base of the corolla tube, and alternate with its segments; filaments often dilated at the base. Ovary superior. Style 1, usually divided at the top. Capsule 1-4-celled, few-seeded.

This order contains over 30 genera and about 800 species distributed all over the world, but more plentiful in tropical countries.

IPOMÆA (MORNING GLORY).—A large genus containing about 300 or 400 species, only a few of which can be grown in the open air in the British Islands. They are mostly climbing or creeping herbs, rarely shrubs, more or less covered with a soft down. Leaves alternate, entire, lobed, or pedately or palmately, rarely pinnately dissected. Sepals broad or narrow, equal or unequal, the inner ones rarely as large as or larger than the outer ones. Corolla salver-shaped, funnel- or bell-shaped; limb 5-folded or plaited. Stamens 5, enclosed or protruding. Disc annular, entire or sinuate, rarely none. Capsule globose or rarely ovoid, membranous leathery or fleshy, containing 4-6 or fewer seeds.

Culture and Propagation.—Ipomæas for the flower garden must be treated as tender annuals in the British Islands. Owing to their rapid growth and gracefully twining habit they make excellent coverings for trellises, arbours, porches, walls, windows, balconies &c., during the warmest months of the year. They may be raised from seed sown in heat about February or March, the seedlings being gradually hardened off in cool airy places till about June, when they may be planted out. Two or three seeds are often sown in small pots, and when the seedlings have grown to a fair size they are shifted bodily into pots of a larger size, with short temporary stakes to uphold the weak stems until they are finally planted out. They like a rich loamy soil, with well-rotted manure or leaf-mould, and plenty of water during growth. Where there is no convenience for raising the plants in heat, the seeds may be sown in April in the open border, in fine rich soil with a little hot manure beneath the soil. A temporary shelter may be made with three bricks placed triangular-wise, and over them a sheet of glass; or a small box will do equally well until the seeds have sprouted. Careful watering should be given, and in mild seasons the plants will grow vigorously and flower freely.

The best kinds for outdoor cultivation are the following:—

I. **hederacea** (*I. Nil; Pharbitis hederacea*).—A beautiful tropical American climbing annual about 10 ft. high, with heart-shaped, 3-lobed Ivy-like leaves. Flowers from July to September, light blue, whitish at the base, solitary, with a very hairy calyx. There are several varieties of this species, among them being *grandiflora*, light blue; *superba*, light blue, edged with white; *atroviolacea*, deep violet and white, and others varying slightly in colour. There are forms with variegated leaves, blotched as if sprinkled with whitewash. The variety *limbata* or (*Pharbitis limbata*), a native of Australia, has flowers about 2½ in. across, and almost as deep, with a pale rose-purple tube, and a deep violet-purple limb edged with white.

Culture &c. as above.

I. **pandurata** (*Convolvulus panduratus; C. candicans*).—An old but practically almost unknown hardy perennial climber, native of the United States, with heart-shaped tapering leaves, rather downy beneath. Flowers in summer, large, white with a purple throat, many on a stalk. Seeds can probably be obtained from American nurserymen.

Culture &c. as above.

I. **purpurea** (*Convolvulus major; C. purpureus; Pharbitis hispida*).—This charming annual from tropical America is nearly always offered in trade catalogues as *Convolvulus major*, and under this name it is best known in gardens. Its stems climb 10 or 12 ft., bearing heart-shaped, undivided leaves, and from June to September dark purple flowers, with hairy sepals, many on a stalk. There are numerous colour varieties, such as *atropurpurea*, deep purple; *Burridgei*, scarlet; *Dicksoni*, deep blue;

alba, white. Seeds of all can be obtained separate or mixed. A rare variety called *aurea superba* has been offered, and also one called *cupaniana*.

Culture &c. as above.

I. versicolor (*Mina lobata*). — A charming annual climber, native of S. Mexico, with 3-lobed leaves, heart-shaped at the base. Flowers in summer, bright rosy-crimson at first, changing to orange and then yellow, in one-sided curved racemes; corolla oblong-cylindrical, 5-toothed; stamens and style much protruding.

Culture &c. as above. In warm sunny places this remarkable species may be grown out of doors, and utilised in the same way as the other Ipomæas. Seeds may be sown in heat in February and March, and by the end of May or June the seedlings may be transplanted to the open ground,

Other species of Ipomæa worth growing as annuals like the above are *bona-nox*, with white flowers which open at night; *Leari*, intense bright blue; *Quamoclit*, scarlet and white varieties; and *rubro-cærulea* or *Hookeri*, which is white in bud, with the limb of a rich lake, changing to beautiful purple-blue when fully expanded.

CALYSTEGIA (Bearbind). — A genus of 7 or 8 trailing or climbing, smooth or scarcely downy herbs, with alternate, entire or rarely palmately lobed leaves. Flowers white, rose, or violet, on 1-flowered axillary stalks. Bracts 2, large, persistent, enclosing the calyx. Sepals nearly equal, or the inner ones much smaller. Corolla bell- or funnel-shaped, with a plaited 5-angled or obscurely 5-lobed limb. Stamens not protruding. Ovary 1-celled or imperfectly 2-celled. Style thread-like, distinctly 2-lobed, broad.

Culture and Propagation. — All the species flourish in ordinary garden soil, and may be increased by seeds sown in the open border in autumn or spring; or by division of the roots in spring. Like the Ipomæas and Convolvulus they are useful for trailing over trellises, arbours &c.

C. dahurica. — A showy Caucasian climber, with perennial roots and smooth or hairy, oblong heart-shaped leaves, having the edges and under nerves more or less tomentose. Flowers in July, rosy-purple; sepals lance-shaped acute, the 2 outer ones largest, enclosed in broadly ovate, acute bracts. Flower stalks 4-angled, downy.

Culture &c. as above. Increased by dividing the creeping roots. May be used for trellises &c., like the Ipomæas.

C. pubescens fl. pl. — The single-flowered form of this Chinese plant is not known in cultivation. The double-flowered one has hastate, downy leaves and flowers during the summer and autumn months, on stalks 2½–3½ in. long. Corolla 2–3 in. across, perfectly double, with long narrow wavy and reflexed petals, at first of a soft rose or flesh colour, afterwards bright rose. Bracts oval, ciliated, with reflexed edges.

Culture &c. as above. This elegant climbing perennial may be utilised for the ornamentation of walls, arbours, and trellises &c. Although a vigorous grower, it likes a rich soil and a warm sunny position, and may be increased by dividing, in spring, its long creeping roots, which are white and very brittle. It may also be used for trailing over ledges of rockwork, old ruins, tree stumps, or for hanging baskets, pots &c.

C. sepium (*C. inflata; C. sylvatica*). *Common Bearbind.*—Although very often and perhaps usually a very troublesome weed, this is a remarkably handsome plant, and there are situations in which it is far from being out of place, such as among old hedges and thickets, which it beautifies with its large white or pink flowers during the summer and autumn months. Leaves membranous, 3–5 in. long, hastate or sagittate, very acute, with basal lobes, blunt or truncate. Flowers 2 in. across, solitary, on 4-angled stalks. Bracts heart-shaped, keeled, acute, longer than the calyx. A North American variety called *incarnata* has rosy flowers.

Culture &c. as above.

C. Soldanella.—A native of our sandy seashores, with extensively running, slender rootstocks, and rarely twining, trailing stems 6–12 in. long. Leaves ½–1½ in. across, roundish or kidney-shaped, fleshy, usually broader than long, with stalks 1–3 in. long. Flowers from June to August, 1–1½ in. across, pale purple or pink, with yellowish folds, solitary on 4-winged stalks. Bracts broadly oblong, blunt, usually a little shorter than the calyx. Also known as *Convolvulus*.

Culture &c. as above. May be grown trailing over rocks, or in the border, in very sandy soil.

CONVOLVULUS (BINDWEED).—The essential characters of Convolvulus are almost identical with those of Calystegia, the chief differences being that Convolvulus has usually several bracts below the calyx, a 2-celled ovary and capsule, and slender stigmas. Indeed for practical garden purposes these two genera might be merged, as they have a similar habit of growth. About 150 species belong to the genus, and are distributed over temperate and tropical regions.

C. **althæoides.**—A charming twining perennial with deciduous stems, native of S. Europe. Leaves shining silvery, lower ones heart-shaped, deeply crenate, upper ones pedately lobed, the middle lobe being long and pinnately cut. Flowers in summer, large, pale red or lilac, usually solitary. A plant known as *argyræus* is probably the same as this, or a variety of it.

Culture and Propagation. — This species may be raised from seeds sown in heat about March, the seedlings being planted out in June. When established it may be increased in spring by dividing the rootstock. In very bleak parts of the country a little covering with ashes or litter is advisable in severe winters.

C. **arvensis** (*Small Bindweed*).—Like *Calystegia sepium* this is often a troublesome weed in gardens, but under cultivation it can be utilised for hanging baskets, or for trailing over old ruins or rough banks. In fact, used judiciously it is a most charming trailer, as may be seen during the summer months on any railway embankment or country roadside, which it covers with a multitude of beautiful white, pink, or pale purple flowers. It has underground slender creeping rootstocks, and trailing stems 1–3 ft. long, bearing hastate or sagittate, entire or sinuate leaves 1–3 in. long. Flowers an inch or more across, usually 2 on a stalk, sometimes more.

Culture &c. as above.

C. **californicus.**—A Californian perennial with climbing stems and long-stalked sagittate light green leaves. The large white flowers have a canary-yellow throat and are borne on long stalks.

Culture &c. as for *C. cantabricus.*

C. **cantabricus.**—A deciduous South European hairy perennial, with trailing branched stems 6–12 in. long, and oblong lance-shaped acute leaves. Flowers in late summer, pale red, usually 2–3 on a stalk. Sepals narrow, very hairy.

Culture and Propagation. — Flourishes in dry, light, sandy soil in borders, warm banks, or rough parts of the rockery. Increased by seed or division in spring.

C. **chinensis.** — A Chinese perennial with creeping rootstock and stems 2–3 ft. long. Leaves greyish-green, hastate, on linear channelled stalks. Flowers in summer, open at night or early morn, rotately funnel-shaped, purple-crimson with an equally pointed yellow star in the centre surrounded by a purple zone.

Culture &c. This species may be treated like the preceding.

C. **Cneorum** (*C. argenteus*). — A shrubby species 1–3 ft. high, native of S. Europe. The lance-shaped leaves are covered with whitish silky hairs or down. The pale rose-coloured flowers, downy on the outer surface, are borne in June and July in clusters at the ends of the shoots.

Culture and Propagation.—Although this species is apt to be killed in cold wet winters, it is, however, hardy enough to stand ordinary mild winters in the south and west. It rarely or never ripens seed in the British Islands, but may be easily increased by means of cuttings. If these are taken from the non-flowering shoots during the summer months, and inserted in sandy soil under a handlight or in a cold frame, they will soon root and may be protected under glass until the following spring. They may then be planted in warm sheltered spots in the rockery, or at the base of a south wall in the less favoured parts of the kingdom.

C. **lineatus.**—A small deciduous perennial 3–6 in. high, native of S. Europe. Leaves lance-shaped acute, stalked, very silky. Flowers in summer, over 1 in. across, deep rose or flesh coloured, hairy outside, 1–2 on a stalk.

Culture and Propagation.—Suitable for the rock garden or border, or for covering bare banks in any soil, but flourishes best in rich sandy loam. Increased by dividing the roots in spring.

C. **mauritanicus.**—A handsome North African trailing perennial, with almost ovate or round alternate leaves 1–1½ in. long, in 2 rows, and on very short stalks. Flowers in summer, about 1 in. across, blue with a white throat, yellow anthers, and a hairy calyx with 5 linear oblong segments, 2 of them shorter than the others.

Culture and Propagation. — This species is excellent for hanging baskets or pots, and is also effectively used in warm sunny parts of the rockery trailing over the faces of rocks. On raised borders or banks it also looks well, and does best in sandy well-drained soil. Increased by cuttings, division, or seed.

C. Scammonia (*Scammony*). — A smooth, deciduous, angular-stemmed species, native of the Levant, with heart-shaped sagittate leaves, truncate at the base. Flowers in July, large, bell-shaped, creamy-white or tinted with red, usually 3 on a stalk.

Culture &c. as above for *C. mauritanicus*. Increased by seeds or division.

C. tricolor.—A charming S. European annual better known in nurserymen's catalogues as *C. minor*. It has branched, trailing, downy stems ascending at the ends about 1 ft. high, and bearing ovate lance-shaped or spoon-shaped hairy leaves. Flowers from July to September, 1½–2 in. across, having a yellow centre with a band of white and an outer band of blue in the type, usually borne singly on stalks arising from the leaf axils. There are many fine varieties, including blue, crimson-violet, rose, striped, and pure white flowers, all of which can be obtained from a packet of mixed seeds. There are also double-flowered forms having clear blue blossoms mixed with white at the base and consisting of several corollas inserted as it were one inside the other. It is somewhat difficult to obtain seeds from these double varieties.

Culture and Propagation.—The seeds of *C. tricolor* and its varieties may be sown in gentle heat in February or March so that the seedlings can be transplanted in May or June; or as the plants are perfectly hardy, seeds may be sown in the open ground in September in warm spots for flowering the following season. Seeds may also be sown without any heat in April and May to flower late in summer and autumn.

NOLANA.—A small genus of smooth or clammy, downy, often diffuse or trailing annual herbs. Leaves solitary or in pairs, sessile or stalked, entire, flat, sometimes fleshy. Flowers in the axils of the leaves, shortly stalked, whitish, bluish, or rosy. Calyx bell-shaped or tubular, 5-cleft. Corolla broadly funnel-shaped, plaited, 5-angled or scarcely lobed. Disc annular, entire, or crenate-lobed, sometimes obscure. Ovary entire, or 5- or more lobed.

Culture and Propagation.—Nolanas grow well in ordinary garden soil in sunny positions in the border or rockery. They are best raised from seeds sown in the open ground in March and April, thinning the seeds out, rather than transplanting them—a process they do not stand well.

N. atriplicifolia (*N. grandiflora*).—A beautiful Peruvian annual with procumbent and rather hairy stems and spoon-shaped leaves, the lower ones long-stalked. Flowers in summer, 1½ in. across, funnel-shaped, beautiful blue, white in the centre. The variety *alba* is recognised by its wholly white flowers.

Culture &c. as above.

N. lanceolata.—A Chilian annual about 6 in. high, with twin lance-shaped, stem-clasping leaves, obliquely adnate at the base. Flowers in summer, blue, white, green.

Culture &c. as above.

N. paradoxa.—A trailing hairy Chilian annual with bluntly ovate hairy leaves, and blue bell- or funnel-shaped flowers borne during summer.

Culture &c. as above.

N. prostrata.—A beautiful trailing Peruvian annual, with ovate oblong or rhomboid ovate entire leaves and pale blue flowers in July.

Culture &c. as above.

N. tenella (*N. paradoxa, Sims*).—A Chilian slender-stemmed annual clothed with a clammy down and having bluntly ovate leaves. Flowers in summer, pale blue, with a paler centre on slender hairy stalks.

Culture &c. as above.

ALONA cælestis, a beautiful Chilian Heath-like bush about 2 ft. high with pale blue bell-shaped flowers, is closely related to the Nolanas, and is an excellent plant for the flower garden during the summer months, but is too tender for British winters. It thrives in peat and loam, and may be readily increased by cuttings in sandy soil in gentle heat.

LXXX. SOLANACEÆ—Nightshade Order

An extensive order of herbs, erect or climbing shrubs, or rarely trees, with alternate or nearly opposite, undivided, dissected, or lobed leaves. Flowers hermaphrodite, usually regular. Calyx inferior, gamosepalous, 5- or rarely 4- or 6–7-lobed, parted or toothed. Corolla gamopetalous tubular, funnel-, salver-, or bell-shaped, or rotate, usually 5-lobed, often plaited. Stamens equal in number to the corolla lobes and alternate with them, attached to the tube, equal or unequal, or only 4 perfect, 2 long and 2 short, as in *Petunia*, *Schizanthus*, *Salpiglossis* &c. Ovary superior. Fruit usually 2-celled (each cell containing many seeds) capsular or baccate.

This important order has 66 genera and about 1200 species distributed over the temperate and tropical parts of the globe. To it belong not only plants which yield virulent poisons like the Deadly Nightshade (*Atropa Belladonna*) and Henbane (*Hyoscyamus niger*) but also such useful plants as the Potato, Tomato, and that revenue-swelling article of commerce, Tobacco.

SOLANUM (Nightshade).—A large genus containing, according to various authors, from 700 to 900 species—more than half the entire order—of spiny or unarmed herbs, shrubs, or small trees, very variable in habit. Leaves alternate, entire, lobed, or pinnately cut, solitary, or in pairs. Flowers yellow, white, violet, or purplish, in forked cymes or rarely one-sided simple racemes. Calyx bell-shaped or spreading, usually 5–10-toothed, lobed, or parted. Corolla rotate or broadly bell-shaped, the limb 5- (rarely 4- or 6-) lobed, plaited in bud. Stamens 5 (rarely 4 or 6); anthers united, opening by terminal pores. Ovary 2- (rarely 3–4-) celled. Fruit a many-seeded berry.

Culture and Propagation.—With the exception of *S. jasminoides* and *S. Wendlandi*—both climbers—all the other species mentioned below are valuable in the British Islands chiefly on account of their bold and handsome appearance for sub-tropical gardening during the summer and autumn months. Of late years they have become more fashionable for this particular purpose, and many more species are grown in this way than formerly. They are treated as tender annuals and are easily raised from seeds sown about February or March in heat, the seedlings being potted on and hardened off in cooler and more airy quarters so as to be in a fit condition for planting out at the end of May. Grown in groups or masses they are very effective and should always have a sunny sheltered position and a deep rich loamy soil with plenty of moisture, otherwise they are not likely to attain luxuriant proportions.

Where convenience for wintering the plants is at hand, cuttings may be taken of the side shoots or tops during the summer months and rooted in a hotbed or under handlights. The rooted plants must be kept fairly warm during the winter, and by June or the end of May they will be fine, sturdy specimens for planting out. But plants raised from seeds are usually more symmetrical in outline, and if grown on quickly in genial heat and moisture in the earlier stages of their existence they will become quite large enough for planting out, when they have been hardened off in rather cooler and more airy quarters.

S. aculeatissimum.—A beautiful free-growing species about 2 ft. high, and of obscure origin. The spreading branches are thickly covered with spines, and violet coloured on the sunny side, bearing broadly ovate leaves, prettily waved and cut into short segments. The young leaves are tinged with violet and afford a pleasing contrast to the pure cold green of the older leaves. Flowers white, numerous, small and pretty, succeeded by attractive berries mottled with pale and dark green.

Culture &c. as above.

S. atropurpureum (*S. sanguineum*).—A fine Brazilian species with erect branching blood-red or purple stems 3–6 ft. high, covered with unequal prickles purple at the base. Leaves 6–7 in. long, and often as much as a foot, deeply and pinnately lobed, with white midribs and covered with strong prickles about 1 in. long. Flowers small, 6–8 in lateral racemes; calyx purplish, corolla yellowish. Fruit at first white, afterwards yellow.

Culture &c. as above.

S. **aviculare** (*Bird Solanum; Kangaroo Apple*).—This vigorous growing and ornamental species, native of Australia and New Zealand, is better known as *S. laciniatum*. It has smooth fleshy stems 5–6 ft. high, bearing leaves pinnately cut into triangular lance-shaped lobes, the end one being entire or linear, the larger leaves are often 6–10 in. long. Flowers violet, about 1 in. across, produced abundantly in short, loose, stalked racemes. Fruit large, green or yellow, and coral-red when quite ripe.

Culture &c. as above.

S. **ciliatum**.—A dwarf annual 1–2 ft. high, native of Porto Rico, with fleshy stems thickly covered with prickles. The prickly ovate oblong leaves are composed of 3–7 ovate acute lobes, and the small white flowers are borne solitary or in pairs in short racemes. Fruits when ripe bright scarlet, large, especially in the variety *macrocarpum* often as large as or larger than a Tangerine Orange.

Culture &c. as above.

S. **citrullifolium**.—A spiny-branched species 1½–2 ft. high, native of Texas. Leaves spiny 5–7-lobed, toothed and pinnately cut. Flowers large, rosy-violet, with orange anthers in the centre, and succeeded by yellow fruits.

Culture &c. as above.

S. **cornutum**.—A beautiful Mexican annual 1½–2 ft. high, with somewhat slender green stems covered with slender spines. Leaves about 4 in. long, pinnately cut into blunt sinuate lobes, the midribs and main veins being prickly. Flowers rather more than 1 in. across, and remarkable for being yellow in colour and very handsome in appearance. They are produced in succession, one or two only being open at a time, and borne in raceme-like clusters. As the flowers wither numerous small fruits covered with numberless slender spines are formed and constitute a distinct and attractive feature of the plant. Seeds of this species have been distributed under the name of *S. fontanesianum*, a nearly allied but distinct kind.

Culture &c. as above.

S. **crinitum**.—A prickly species 4–5 ft. high, native of Cayenne. Leaves 1–2 ft. long, broadly ovate, sinuate-lobed, with purple veins, yellowish-green and smooth above, whitish, prickly beneath. Flowers deep blue, about 2 in. across, in cymose lateral racemes about 4 in. long.

Culture &c. as above.

S. **crispum** (*Potato Tree*).—A showy Chilian species 12–16 ft. high, with simple undivided, entire, or slightly waved, more or less ovate leaves 3–4 in. long, loosely crisped at the edges. Flowers less than 1 in. across, bluish-purple, fragrant, in corymbs about 3 or 4 in. long. Fruit white, about the size of Peas.

Culture and Propagation.—In the south of England and Ireland, this species is hardy enough for mild winters. In less favoured places it requires the shelter of a sunny wall. Many of the branches may be injured by frost, but these may be cut out in spring, and new vigorous shoots will take their place. There is a Privet-leaved variety called *ligustrinum* with smooth branches and rather heart-shaped leaves about 1½ in. long.

S. **ferrugineum**.—A vigorous bushy S. American species 3–5 ft. high covered with a rusty-coloured down. Stems winged owing to the decurrent leaves, and armed like them with strong spines. Leaves decurrent, heart-shaped oval, obscurely or sinuately lobed, covered with a somewhat clammy down, bright green beneath. Flowers lilac-purple with yellow anthers, borne in large curved and corymb-like clusters; berries about the size of a pea, greenish-black when ripe, resembling those of the Black British Nightshade—*S. nigrum*.

Culture &c. as above.

S. **giganteum** (*S. niveum*).—A vigorous and ornamental S. African species with thick, fleshy, prickly, and woolly white stems said to attain a height of 10–25 ft., but only about 5–6 ft. high in cultivation. Leaves about 8 in. long, elliptic, wavy, without spines, deep green above, woolly white beneath. Flowers about ¾ in. across, blue, with yellow stamens, in dense woolly white terminal cymes.

Berries about the size of Peas, roundish, red.

Culture &c. as above.

S. guineense.—A West African species 2–4 ft. high, with angular stems and ovate leaves. The small violet flowers are succeeded by dark shining blue-black fruits.

Culture &c. as above.

S. jasminoides.—A charming deciduous S. American climber with twiggy woody stems 3–4 ft. long. Leaves mostly ovate lance-shaped tapering, about 2 in. long. Flowers from August to October, 1 in. or more across, somewhat star-shaped, white or faintly tinted with greyish-blue, in drooping trusses. The variety *floribundum* has smaller leaves, and flowers more freely than the type.

Culture and Propagation. — This species is suitable for training against a south or west wall in deep light soil. It is often to be seen trailing on the roofs of greenhouses, but may be considered hardy out of doors from the Thames Valley southwards in ordinary mild winters. It may be increased by cuttings of the non-flowering shoots inserted in sandy soil during the summer months under a hand-light, and kept moist and shaded until fairly well rooted.

S. lasiostylum.—A woolly spiny species 1–2 ft. high, native of the West Australian deserts and closely related to *S. marginatum*, but with purple flowers and white woolly leaves.

Culture &c. as above. It is easily raised from seeds sown in sandy loam. The plants require light sandy soil and must not be watered too freely. It is not yet well known, but is worth growing.

S. marginatum (*S. abyssinicum*).—A strong-growing bushy Abyssinian species 3–4 ft. high, covered with a whitish wool and armed with stiff prickles. Leaves somewhat heart-shaped, leathery, sinuately and obtusely lobed, covered with prickles on both sides, snowy-white beneath, green above, with a white margin. Flowers white, about 1 in. across or more, with a small purple centre and a 5–6-cleft prickly or unarmed calyx. Berries round, yellow when ripe, 1 in. or more in diameter.

Culture &c. as above. The seeds of this species are best sown in autumn, the young plants being wintered in a greenhouse until June.

S. maroniense (*S. macranthum*).—A handsome Brazilian species with prickly stems which often grow 7 ft. high in this country, but twice as much in a wild state. Leaves solitary, nearly stalkless, 10–15 in. long, broadly ovate lance-shaped with large coarse teeth or angles, and very prickly on the nerves. Flowers 1½–2½ in. across, bluish-violet, 5–7 in a cymose raceme.

Culture &c. as above.

S. pyracanthum. — A handsome shrubby species 3–6 ft. high, native of Madagascar. Leaves stalked, softly downy, oblong tapering acute, 5–6 in. long, unequal at the base, and pinnately divided into ovate lance-shaped lobes. Both stems and leaves are thickly covered with long awl-shaped fiery red or scarlet prickles. Flowers 1 in. across, violet-blue, in many-flowered cymose racemes.

Culture &c. as above. This ornamental species is rendered particularly attractive by the brilliant colouring of its prickles. It thrives in a light rich soil, and should be grown in beds or groups by itself for effectiveness.

S. quercifolium. — A large-growing ornamental species with deeply-cut Oak-like leaves, and large violet-blue flowers.

Culture &c. as above.

S. quitoënse.—A beautiful and somewhat shrubby Peruvian plant 2–3 ft. high, covered with soft hairs. Leaves softly woolly, on hairy stalks 2–3 in. long, heart-shaped in outline, but having 11–14 broad triangular lobes; the young leaves being green above, and velvety amaranth beneath. Flowers an inch or more across, white within, violet and woolly outside, 4–5 in a raceme. Fruits about the size of a small Orange, woolly at first, afterwards smooth and shining, fragrant and edible.

Culture and Propagation. — So far this species has not ripened fruits in this country either in the open air or in greenhouses. It is not yet well-known but is worthy of cultivation on account of its ornamental appearance. Grown in greenhouses as a crop it would probably produce bunches of valuable fruits in the same way as the Tomato. It may be increased by cuttings in summer placed in sandy soil in a little heat under a bell-glass, the plants being wintered in a greenhouse until May or June.

S. robustum.—A vigorous and highly ornamental species, native of Brazil, 2–4 ft. high, the branching woolly stems and principal nerves of the leaves being furnished with strong sharp prickles. Leaves decurrent. 5–8 in. or more long, sharply oval elliptic with 8–9 blunt lobes, or triangular near the apex, green and covered with a velvety down above, rusty yellow and woolly beneath. Flowers white, over 1 in. across, borne in clustered racemes. Fruits roundish, brownish-red.

Culture &c. as above. In warm sunny places sheltered from violent winds, this species is very ornamental either as isolated specimens or in groups on lawns.

S. sisymbrifolium (*S. Balbisi; S. decurrens*). — A beautiful Brazilian species about 4 ft. high, with decurrent leaves deeply and pinnately cut into oblong sinuate lobes, again more or less deeply divided, the entire plant armed with prickles. Flowers 1 in. or more across, pale blue or white, in terminal and somewhat curved racemes. Fruit ovoid, about the size of a large Bigarreau Cherry, reddish-orange in colour, and somewhat acidly sweet when ripe. There are one or two forms with much-divided leaves.

Culture &c. as above.

S. Torreyi. — A free-flowering North American perennial more or less covered with prickles. The leaves are 2–3 in. long, ovate in outline, with a cordate or hastate base, and a sinuately lobed margin, the under surface being covered with a mealy down. The purple flowers 2 in. across are borne in nodding racemes.

Culture &c. as above.

S. Warscewiczi.—A vigorous bushy species, probably S. American, 3–6 ft. high, covered with red hairs, and armed with sharp curved spines. Leaves large, soft green above, greyish beneath, oval or almost heart-shaped, deeply and unequally lobed, with stout stalk and midrib covered with red starry prickles. Flowers white, about 1½ in. across, in clustered curved corymb-like racemes. Fruit pale yellow, smooth, shining.

Culture &c. as above. Increased by cuttings in summer as in the case of *S. quitoënse.*

S. Wendlandi.—This is undoubtedly the most ornamental flowering Nightshade in cultivation, and there is no reason why it should not prove fairly hardy along the southern coasts of England and Ireland, especially in mild winters. It is a somewhat prickly climbing shrub, native of the mountains of Costa Rica, with large deep green leaves 6–10 in. long, on prickly stalks, and pinnately cut into 5 obliquely oval lobes, the terminal one being 2–3 times as large as the others. Flowers about 2½ in. across, in large drooping clusters, soft lilac-blue, papery, with a conspicuous bunch of bright yellow stamens in the centre, from which radiate the 5 star-like divisions of the circular corolla.

Culture and Propagation.—As seeds of this species have not yet been produced in this country owing chiefly to the sterile stamens, the plant must be propagated by means of cuttings in the same way as *S. quitoënse.* It flourishes in ordinary good garden soil, but is best in good rich sandy loam. As a cool greenhouse climber it is very ornamental and deserves to be generally grown.

CYPHOMANDRA (Tree Tomato). A genus containing 24 species of non-spiny small trees or shrubs with entire 3-lobed or pinnately cut leaves. The floral characters are almost the same as in *Solanum.* There is only one species of any note in cultivation, that described below, and even this is chiefly grown as a greenhouse plant in most parts of the country. It may be easily raised from seeds or cuttings like many of the Solanums, and used for sub-tropical gardening in the summer. The bright orange-red fruits look very handsome drooping from the branches, and are almost as good as Tomatoes for eating. The plants flourish in rich sandy loam and leaf soil.

C. betacea (*Solanum fragrans*). — A Brazilian shrub or small tree 12–24 ft. high, with fleshy entire, dark glossy green leaves, and greenish flowers with a dark streak on the back of each segment, and borne in long drooping racemes. Fruit about the size and shape of a hen's egg, produced in the open air in warm seasons.

Culture &c. as above.

PHYSALIS (*Winter Cherry*). — A genus of about thirty species of annual or perennial herbs clothed with simple or stellate hairs, and having entire lobed or rarely pinnately cut leaves. Flowers solitary and stalked in the leaf axils, violet, yellowish or white, often purple at the base. Calyx bell-shaped or conical, 5-cleft, 5-angled or prominently 10-ribbed, often ultimately inflated or balloon-like and enclosing the ripe fruits. Corolla somewhat rotate or broadly bell-shaped, 5-angled or shortly 5-lobed. Stamens 5. Ovary 2-celled. Stigma 2-cleft. Berry globose, enclosed by and much smaller than the inflated calyx. Seeds numerous.

Culture and Propagation.—The kinds mentioned below are the only ones worth growing. They thrive in fairly rich sandy soil and leaf-mould, and are perfectly hardy. They are very ornamental in late summer and autumn on account of the bright orange-red balloon-like calyces which have been popularly termed 'Chinese Lanterns.' They are easily raised from seeds sown in autumn in cold frames, or in spring in the open ground. They may also be divided when the leaves and stems have died down; or during the summer months the tops of the shoots may be inserted in sandy moist soil as cuttings, when they will soon root in a cool shady place. It may be mentioned here that the name 'Winter Cherry' is applied with much appropriateness to *Solanum capsicastrum*, a greenhouse shrubby species with scarlet Cherry-like fruits.

P. Alkekengi (*Winter Cherry*). — A dwarf branching perennial, 1–1½ ft. high, extending from S.E. Europe to China in a wild state. Leaves in pairs, entire, more or less ovate-acute, on long stalks. Flowers in summer, rotate, whitish, solitary, on slender stalks springing from the leaf axils. Ripened calyx blood-red, about 1 in. or more in diameter, and enclosing a scarlet berry containing numerous flat yellow seeds. If allowed to remain on the plant during the winter, the calyx becomes skeletonised, all the fleshy tissue rotting away, leaving only the beautiful tracery of netted veins. *Culture &c.* as above. Increased by seeds, cuttings, or division. Owing to the brilliant colour of the inflated calyces and the profusion in which they are borne, this species and the following are in great demand by florists, who use them for decorative purposes either in bunches by themselves or mixed with other flowers.

P. Francheti.—A vigorous and highly ornamental Japanese perennial, 1–2 ft. high, with broadly ovate oblong leaves, 3–4 in. long, white flowers and orange-red inflated calyces, about 3 in. long, and 8–9 in circumference, strongly ribbed, and drooping. It is altogether larger in every part and more robust than *P. Alkekengi*, and will flourish under similar conditions. As a pot plant it can be made into fine bushy specimens covered with its Chinese Lantern-like fruits, which look extremely handsome in the greenhouse or conservatory.

Culture &c. as above. Increased by seeds, cuttings, or division.

JABOROSA.—A genus having 6 or 7 species of perennial herbs, often with thickish roots and creeping, trailing, and tufted stems. Leaves toothed, Dandelion-like or deeply divided. Flowers white or dull yellow. Calyx bell-shaped 5-cleft. Corolla rather funnel-shaped with a long tube often very hairy at the base, and 5 acute spreading lobes. Stamens insulated above the middle of the tube. Ovary 2–5-celled, becoming a roundish berry when mature.

J. integrifolia. — A pretty perennial about 6 in. high, native of Buenos Ayres. It makes compact tufts of deep green stalked oval and almost entire leaves. During the summer months it produces white funnel-shaped flowers.

Culture and Propagation. — This attractive plant flourishes in ordinary good garden soil of a sandy nature in the rock garden or border, and likes to be fully exposed to the sun in sheltered situations. It may be increased by dividing the tufts in spring as growth is commencing; by inserting cuttings of the non-flowering shoots in cold frames during the summer months; and also by sowing seeds, when ripe or in spring, in cold frames

LYCIUM (Box Thorn).—An extensive genus of small trees or shrubs, with the joints often produced into spines. Leaves entire, linear-roundish or flat and often short. Flowers stalked, solitary, or in clusters in the axils of the leaves, white, pale violet, rosy, scarlet, or yellowish. Calyx bell-shaped, truncate and irregularly 3–5-toothed or cleft. Corolla tubular funnel-shaped, or somewhat bell-shaped or urn-shaped, with 5 flat lobes (rarely 4), and a short or long tube. Stamens 5, rarely 4, protruding or not. Disc angular or cup-shaped. Ovary 2-celled. Fruit a round, ovoid, or oblong berry, enclosed in the calyx tube.

Culture and Propagation.—The Box Thorns thrive in almost any soil and seem to be quite indifferent to its fertility or sterility. They are useful for clambering over old walls, trellises, ruins &c., in semi-wild or rough parts of the garden, being scarcely ornamental enough to rank with choice climbers. They may be increased in spring and autumn by cuttings inserted in sandy soil in a cold frame, or by layers of the lower branches, or by suckers from the roots. They all grow freely and flower profusely.

L. afrum. — A handsome erect spiny shrub, 6–10 ft. high, native of N. Africa. Leaves clustered, linear, hoary, narrowed at the base, fleshy. Flowers in June and July, violet, almost in the axils of the leaves, solitary, drooping.

Culture &c. as above.

L. barbarum.—An ornamental climbing shrub, native of N. Asia, but now practically naturalised in parts of the British Islands and known in some places as the 'Duke of Argyle's Tea Plant.' It has angular drooping branches, and flattish or twisted lance-shaped leaves 1½-2 in. long. Flowers from May to August, about ¾ in. across, erect, dull rosy-purple, with deeper coloured veins, and greenish-yellow at the base, borne singly or in threes in the leaf axils—the central flower opening first. Stamens protruding, inserted in the tube with a tuft of white hairs at the base.

Culture &c. as above.

L. europæum. — An erect-growing spiny shrub, 10–12 ft. high, native of S. Europe, with obovate lance-shaped, blunt or spoon-shaped leaves in clusters. Flowers from May to August, pale violet, veined with red, solitary or in pairs.

Culture &c. as above.

DATURA (THORN APPLE; TRUMPET FLOWER).—A genus containing about a dozen species of annual herbs, shrubs, or trees, smooth or slightly downy, with large entire or coarsely sinuate-toothed leaves. Flowers large, solitary, from or near the axils of the leaves, white or coloured, erect or drooping. Calyx long, tubular, herbaceous, 5-cleft or spathe-like. Corolla funnel-shaped, shortly and broadly 5-lobed, plaited, lobes often taper-pointed. Stamens 5, attached near the base of the corolla tube, anthers sometimes cohering in a cylinder. Ovary 2-celled. Stigma 2-cleft. Fruit a spiny or smooth capsule, with poisonous seeds.

Culture and Propagation.—The annual Daturas are of very easy cultivation, although few of them are hardy. They are raised from seeds sown on a hotbed in February or March, the seedlings when large enough being transferred to small pots in which they are grown on with as much light and air as possible until June, when they are planted in the open air. They flourish in light sandy soil and warm sheltered situations. Being vigorous and spreading in growth, they require plenty of space, say about 2 ft. apart, to develop their growth properly.

The perennial or shrubby Daturas are better known in gardens under the name of *Brugmansia.* They are stately plants, and although mostly tender can be grown out of doors from June to October with the greatest ease in rich sandy soil and leaf mould. They look best as standard trees about 8 ft. high, so that their fine trumpet-shaped flowers can hang down easily and be fully exposed to view. They are readily increased from cuttings of the young shoots about 4–6 in. long, taken off in spring with a small portion of the old ripened wood attached. Each cutting is put in a small pot in sandy soil and plunged in bottom heat. As soon as well rooted they should be shifted into larger pots and grown on as quickly as possible with plenty of light. In April and May a cooler atmosphere is necessary to harden them off for planting out about the first week in June, earlier or later according to northern or southern localities and the prevailing weather. They are probably more effective as single specimens with dwarfer plants at the base than when grown in beds or groups. In the autumn they should be carefully lifted and planted in tubs rather than pots, and transferred to the greenhouse for the winter months. The shoots may suffer somewhat by the process, but in early spring they should in any case be cut back so as to induce new shoots to develop. As the plants from spring cuttings produce only few flowers the first season, older plants may be obtained by rooting cuttings late in summer in bottom heat, and growing on in rich soil until the following June. About February the plants may be stimulated into more vigorous growth by occasional applications of weak liquid manure, or even a top-dressing of well-rotted cow-manure.

D. arborea (*Brugmansia candida*). A fine Peruvian shrub, 7–10 ft. high, clothed with a whitish powdery down, and having elliptic-oblong, quite entire leaves. Flowers in August, white, 7–8 in. long. Closely related is the Chilian *D. aurea*, which resembles *D. arborea* in habit and foliage, but has golden-yellow flowers.

Culture &c. as above.

D. ceratocaula (*Ceratocaulos daturoides*).—A beautiful Cuban annual 2–3 ft. high, with round purplish forking stems, hairy at the base, and sometimes covered with a greyish powder. Leaves ovate, lance-shaped, toothed, hoary beneath. Flowers in July, sweet-scented, 4–5 in. across, white tinged with purple, opening in the afternoon, and having a greenish tube 6 in. or more long.

Culture &c. as above. In the warmer parts of the country, such as the south of England and Ireland, seeds of this species often mature and sow themselves naturally. If allowed to remain and covered with fine soil, they will sprout in spring and produce excellent plants.

D. chlorantha fl. pl. (*D. flava; D. humilis*).—A handsome free-flowering species of unknown origin, but probably a native of India. It rarely exceeds 1½–2½ ft. high in cultivation, and has round stems bearing oval acute, angled or entire, deep green leaves. Flowers from August to October, sweet-scented, yellow, solitary, drooping, double, with, as it were, 2 or 3 trumpet-shaped corollas placed one inside the other, and having regular taper-pointed lobes.

Culture and Propagation.—Useful for borders or in beds or groups by itself in warm sheltered places. Raised from seeds sown in early spring. It has been grown outside in winter but was always killed.

D. cornigera.—A remarkable species 3–10 ft. high, with shrubby stems clothed with a soft down when young. Leaves stalked, ovate taper-pointed, entire or sinuate-toothed. Flowers in summer, drooping, 6–8 in. long, creamy-white, large, funnel-shaped, striped, with 5 lobes ending in a long awl-shaped, spreading, or recurved point. *D. Knighti* is a fine variety with large drooping double white flowers.

Culture &c. as above recommended for the *Brugmansias*.

D. Cornucopia.—A beautiful bushy annual 1–1½ ft. high, with broadly ovate acute wavy leaves, and somewhat erect large, funnel-shaped double flowers, with a purple mottled tube 6–8 in. long, and a lilac spreading limb, 6 in. across, with long recurved awl-like tails to each of the lobes. There are 2 or 3 corollas placed one inside the other.

Culture and Propagation.—From seeds sown in spring plants can be obtained in flower from August to October, and from seeds sown about October plants grown in warm greenhouses during the winter will bloom early in March.

D. fastuosa (*Egyptian Thorn Apple*). A bushy Indian annual 2–3 ft. high with ovate pointed unequally sinuate-toothed leaves emitting a disagreeable odour when bruised. Flowers in July, solitary, erect, very fragrant, trumpet-shaped, creamy white within, violet outside, with 5 sharply pointed lobes. There is a variety with double white flowers (*alba fl. pl.*), and also one with double violet and cream flowers (*violacea fl. pl.*) like the single form, only having 2 or 3 corollas inserted one within the other. The variety *huberiana* is another double variety near the others.

Culture &c. as above. They all require treatment similar to *D. Cornucopia.*

D. Metel.—A pretty downy annual about 2 ft. high, native of tropical America. Leaves heart-shaped, quite entire or slightly toothed, emitting a disagreeable odour when bruised. Flowers in June, large, fragrant, erect, trumpet-shaped, pure white, 4–6 in. long. Fruit capsules round, prickly, about the size of an Apple.

Culture &c. as above. Owing to the forked and bushy habit of this species, the plants should be about 1½–2 ft. apart when planted out to allow for proper growth.

D. meteloides (*D. Wrighti*).—A handsome species 3–4 ft. high, native of Texas, California &c., somewhat resembling *D. Metel*, but distinguished by its looser habit, by its oval-oblong and more toothed leaves, by its larger funnel-shaped flowers, 4–6 in. across, of a soft clear lilac, which are borne from August to October, and by its tubular 10-toothed calyx.

Culture and Propagation.—This remarkable plant may be raised from seeds in spring or autumn like *D. Cornucopia* and *D. fastuosa*, and is quite as easily cultivated. Grown in beds or borders, the plants require to be at least 1½–2 ft. apart. Being a perennial the plants may be lifted in autumn and wintered in a greenhouse or conservatory. By growing on slowly with not too much water, they will flower early the following year. The roots being tuberous may also be stored away in a dry cool frost-proof place during the winter like Dahlias, and planted out again in spring. Experience, however, teaches that the finest, most symmetrical and free-flowering plants are those raised from seeds sown early in spring every year.

D. quercifolia. — A Mexican annual 1–2 ft. high, with leaves pinnately lobed and cut like those of the Oak, and hairy on the veins beneath. Flowers from July to September, violet.

Culture &c. as above. Raised from seeds annually in early spring.

D. sanguinea (*Brugmansia sanguinea*).—An elegant shrub or small tree, 4–8 ft. high in cultivation, with leaves often in pairs, bluntly ovate-oblong, waved and shallowly lobed, densely covered on both sides with soft white hairs, and borne on stout hairy stalks flattened above. Flowers in summer, solitary, funnel-shaped, about 7 in. long, with a thick and fleshy orange-yellow tube greenish towards the base. Calyx large, inflated, 5-angled and ribbed, prominently veined and very downy.

Of all the shrubby Daturas this is the hardiest and the most likely to stand our British winters if not too severe. It has passed uninjured through 14° of frost at Colwyn Bay, and 18° at Ventnor, in the Isle of Wight, but it has suffered with a few degrees in the shires of Lincoln, Cardigan, Gloucester, and Buckingham. This fact is accounted for by local surroundings, the absence of wind shelters, soil &c., but it proves that in parts where the air is naturally mild, even in severe winters, and the position sheltered, *D. sanguinea* stands a fair chance of proving hardy in ordinary winters.

Culture and Propagation.—It may be increased by cuttings in spring or autumn as before recommended for the shrubby Daturas, and the soil in which it grows should consist of rich sandy loam and leaf-mould with a mulching of rotted cow manure during hot dry summers.

D. Stramonium (*Common Thorn Apple*). — An East Indian annual now frequently met with as a casual weed in the British Islands, Europe, Asia, N. Africa, and N. America. It grows about 2 ft. high, and has smooth stems and ovate triangularly toothed leaves, wedge-shaped at the base. Flowers in July and August, pure white in the type. There is a more ornamental variety with purplish-violet stems and violet flowers worthy of cultivation. The egg-shaped fruits are large and prickly.

The Common Thorn Apple, and especially its violet-coloured variety, is worth growing in rough parts of the garden, and the fact that it is as hardy as a weed should not detract from its beauty as a flowering plant.

Culture &c. as above. Seeds if sown in autumn and left to take care of themselves will make fine plants the following year.

D. suaveolens (*Brugmansia suaveolens*). — A handsome Mexican tree or shrub, 10–15 ft. high, with elliptic oblong quite entire leaves, smooth above and slightly downy beneath. Flowers in August, large, white, sweet-scented.

Culture &c.—This is extensively grown in greenhouses, but for the outdoor garden may be grown in the same way as *arborea*, *cornigera*, *Knighti* and *sanguinea*.

SCOPOLIA. — A genus with only a few species of erect, scarcely branched, perennial herbs, with entire, membranous leaves, and solitary nodding flowers on slender pedicels. Calyx broadly bell-shaped, membranous, truncate, or broadly and shortly 5-lobed. Corolla large, bell-shaped, with a plaited, 5-angled, or very shortly and broadly 5-lobed limb. Stamens 5. Disc thick, cushion-like, 5-furrowed. Ovary conical. Capsule enclosed by the calyx, many-seeded.

Culture and Propagation.—Scopolias flourish in rich, light, dry soils in rather shaded situations, and when grown in masses in the border or groups by themselves are effective. They may be increased by division of the roots in autumn or early spring, and also from seeds sown in spring in gentle heat, or in April in the open border. Cuttings of the non-flowering shoots may also be rooted in cold frames during the summer months in sandy soil in the same way as recommended for Physalis (see p. 690).

S. carniolica (*Hyoscyamus Scopolia*). A pretty Russian herbaceous perennial, 1 ft. or more high, with ovate or obovate oblong entire and somewhat cuspidate leaves, 3 in. or more long, on shortish stalks. Flowers in April, lurid red outside, yellow or green within, ¾ in. long, nodding on slender stalks. The variety *concolor* (which has also been *hladnikiana* and *fladnikiana*) differs from the type chiefly in having pale yellow drooping bell-shaped flowers about an inch deep.

Culture &c. as above.

S. lurida (*Whitleya stramonifolia*).—An Indian species, 4–6 ft. high, with ovate acute wrinkled wavy leaves, the larger ones often 6–7 in. long, smooth above, more or less hoary beneath. Flowers in September, changing from green at first to yellow, and at length purple.

Culture &c. as above.

PHYSOCHLAINA. — A genus containing 4 species of smooth erect perennials with membranous entire or sinuate leaves. The flowers are borne in loose or dense, erect or drooping corymbs at the ends of the shoots. Calyx tubular bell-shaped 5-cleft. Corolla funnel-shaped or somewhat campanulate with 5 erect or spreading lobes. Stamens inserted in the middle of the tube. Ovary 2-celled, becoming a capsule which opens round the middle or near the apex by an entire or fissured lid.

Culture and Propagation. — These plants somewhat resemble the Scopolias, and like them may be used for the decoration of the flower border or rock garden. They thrive in ordinary good garden soil and may be increased by seeds sown in autumn or spring in frames; by cuttings of the non-flowering shoots; or by division of the roots in spring.

P. grandiflora.—A native of Thibet about 18 in. high, with downy stems and ovate pointed alternate leaves. Flowers in March and April, greenish-yellow, purple at the edges, drooping and somewhat bell-shaped.

Culture &c. as above.

P. orientalis (*Hyoscyamus orientalis*). A Caucasian perennial 1–1½ ft. high, with downy deltoid ovate entire or sinuate leaves. Flowers from March to May, pale purplish-blue, borne in clusters or heads on the stalks.

Culture &c. as above.

FABIANA. — A genus containing about a dozen species of erect, much-branched, often clammy, Heath-like bushes, with small leaves in clusters, and numerous shortly stalked flowers at the ends of the branches or opposite the leaves. Calyx tubular, bell-shaped, with 5 bluntly ovate or rarely linear teeth or lobes. Corolla tube elongated, dilated or inflated at the upper end, and contracted at the mouth; limb short, 5-lobed. Stamens 5, attached at or below the middle of the corolla tube. Ovary 2-celled. Stigma 2-lobed or nearly peltate. Capsule oblong, many-seeded.

F. imbricata. — A pretty Chilian Heath-like shrub, about 3 ft. high, with small ovate sessile crowded evergreen leaves, and a profusion of pure white, funnel-shaped flowers in May.

Culture and Propagation. — Except in the milder parts of the British Islands this plant is not perfectly hardy, and requires protection in bleak cold situations during the winter. It flourishes in ordinary good garden soil, and is excellent for peaty borders, with Heaths, and other Ericaceous plants. It may be increased by cuttings of the ripened or firm young shoots inserted in sandy soil under a handlight in spring, and kept close and shaded for some time.

NICOTIANA (Tobacco).—More than 50 species of Tobacco have been described, but probably not more than 35 are really distinct. They consist chiefly of herbs, or sometimes bushes, with clammy hairs; rarely smooth and glaucous, somewhat arboreous shrubs. Leaves undivided, entire, or rarely sinuate. Flowers white, yellowish, greenish, or purplish, in terminal panicles, or elongated one-sided racemes, with or without bracts, or the lower ones solitary in the leaf axils. Calyx ovoid or tubular, bell-shaped, 5-cleft. Corolla funnel- or salver-shaped, sometimes with a very long tube, and 5 spreading lobes. Stamens 5, attached below the middle of the corolla tube, enclosed or protruding. Ovary 2-, rarely 4 or more, celled. Capsule many-seeded.

Culture and Propagation. — The Tobaccos flourish in deep rich moist soil, and warm sunny positions, and are very ornamental plants for the flower garden during the summer months. They grow very quickly from seeds sown in gentle heat about February or March. When large enough, the seedlings are pricked off into shallow boxes or singly in pots and grown on in a genial temperature—about 60°–65° Fahr., gradually giving plenty of air, and a somewhat cooler temperature from the beginning of May, so as to harden the plants by the beginning of June, when they can be transferred to the outdoor garden at distances varying from 2 to 8 ft. During hot, dry summers they must be copiously watered, and a mulching of well-decomposed cow-manure or occasional waterings with liquid manure will induce the plants to attain luxuriant proportions and abundance of blossom. The following are a few of the most suitable garden kinds :—

N. acutiflora. — An ornamental Brazilian species 1–2 ft. high, with oblong elliptic leaves, the upper ones lobed at the base. Flowers from June to October, 2–3 in. across, pure white, with a slender cylindrical tube 4–5 in. long.

Culture &c. as above. Raised from seeds in spring.

N. affinis. — A somewhat glaucous hairy species 2–3 ft. high, native of tropical America, with bluntly ovate leaves about 6 in. long, narrowed into a winged stalk; the upper ones smaller, broad, and stem-clasping. Flowers in summer, 3 in. across, whitish inside, greenish outside, and having a slender hairy tube 3–4 in. long. The flowers usually open towards evening, remaining open all night and emitting a delicious odour.

This is the favourite Tobacco Plant for flower gardens, and it is used in a variety of ways according to taste, in masses by itself, in borders, by woodland walks, in conjunction with dwarfer plants like Violas and Heliotropes &c.

Culture and Propagation.—Although treated as an annual *N. affinis* is really a perennial, and in autumn it may be taken up and potted, and kept in the conservatory or greenhouse until spring. As it is so easily produced from seeds, however, it is scarcely worth while to trouble so much about it.

N. glauca. — A beautiful glaucous biennial shrub 10–20 ft. high, native of Buenos Ayres. Leaves long-stalked, unequally heart-shaped, ovate, smooth, glaucous. Flowers from August to October, yellow, covered with a soft down, and having a cylindrical tube 1 in. or more long; the limb small cup-shaped with short acute segments.

Culture and Propagation.—This fine species produces a grand effect owing to its great size, its elegant foliage, and its numerous flexible branches weighed down at the tips by the long panicles of flowers. Owing to its rapid growth it may be used in masses to hide unsightly parts of the garden, but it is also valuable in groups on lawns &c. and for sub-tropical effects. It may be raised from seeds in early spring, and in the autumn the plants may be lifted and transferred to the greenhouse for shelter until the following spring. It may also be increased by inserting cuttings in July and August in sandy soil in a cold shaded frame, the young plants thus obtained being wintered in a greenhouse. Plants from cuttings and the old shoots possess the advantage of attaining larger dimensions and earlier and more numerous flowers than those raised from seeds the same year.

N. longiflora (*N. angustifolia*). — A Chilian species 2–3 ft. high, with lower leaves ovate-lance-shaped, acute, upper ones heart-shaped, lanceolate, taper-pointed. Flowers in August 1½–2 in. across, changing from white at first to purple or yellowish-green, produced singly at the sides of the stems, or in simple racemes at the ends of the branches.

Culture &c. as above. This species is suitable for borders or beds, and the plants should not be nearer to each other than 1½–2 ft.

N. macrophylla (*N. gigantea; N. latissima*). — A native of tropical America, nearly related to *N. Tabacum*, from which it differs chiefly in its stronger growth, in its larger and broader, oval, stalkless or stalked leaves, and in its larger pale red flowers with less obtuse or slightly mucronate lobes. It flowers at the same period and may be cultivated and increased in the same way. There are forms of this species differing considerably from the type, one particularly, *gigantea*, being much more vigorous and attaining a height of 6–8 ft. with larger leaves and flowers, the latter being a rosy-purple or rosy-carmine.

Culture &c. as above.

N. suaveolens (*N. undulata*). — An Australian species 1–2 ft. high, with ovate lance-shaped, wavy, nearly stalkless leaves and loose panicles of fragrant white cylindrical flowers in summer.

Culture &c. as above.

N. Tabacum (*N. havanensis*).—*Common Tobacco.*—A bushy American species about 4 ft. high, covered with down and somewhat clammy to the touch. Leaves without stalks, oblong lance-shaped, taper-pointed. Flowers in summer, inflated, rosy, downy outside, in short many-flowered racemes. There are several varieties of this species differing only in the size of the leaves and the colour of the flowers, but all more or less alike.

Culture &c. as above. This is a useful and ornamental plant for groups or borders, and especially for masses on lawns, or at the sides of streams, lakes, ponds &c., in warm, sheltered positions where its elegant foliage will not be torn about by strong winds. It may be lifted in autumn into pots and wintered in the greenhouse. Under this treatment the stems become somewhat woody and the plants may last and flower for two or three seasons. Increased also annually from seeds sown in spring.

N. tomentosa (*N. colossea; Lehmannia tomentosa*). — A vigorous Peruvian species growing 9–10 ft. high in favourable seasons, and having huge oval leaves, sometimes larger even than those of *Wigandia macrophylla* (p. 670). Its flowers, which appear during the summer months, or in winter or spring under glass, are comparatively small, but in great numbers in panicles. It is not for the flowers, however, that this species is cultivated, but for its noble and imposing appearance. It may be grown and increased in the same way as *N. glauca.* There is a beautiful but more tender variety called *variegata* having the leaves blotched and marbled with creamy white and pale yellow—a graceful plant for beds and borders.

Culture &c. as for *N. glauca.*

N. wigandioides.—A native of Columbia with large, hairy, ovate, taper-pointed leaves and large drooping panicles of yellowish-white salver-shaped flowers. This species, on account of its massive foliage, is excellent for giving sub-tropical effects in warm, sheltered spots.

Culture &c. as above.

PETUNIA. — A genus containing about 12 species of branching, often downy and clammy annuals and perennials with entire and often small leaves. Flowers violet or white, sometimes showy, sometimes minute, on solitary stalks. Calyx with five oblong or linear blunt lobes. Corolla funnel- or salver-shaped, with a cylindrical tube and a plaited, 5-lobed spreading limb. Stamens 5, one of which is effete or rudimentary, the 4 others being unequal—2 long and 2 short (didynamous). Disc fleshy, entire or sinuately 2-lobed. Ovary 2-celled. Capsule many-seeded.

P. nyctaginiflora. — A S. American glandular hairy species about 2 ft. high, emitting a somewhat disagreeable odour, especially at night time and in stormy weather. Leaves ovate-oblong, bluntish, almost or quite stalkless, the upper ones in pairs, heart-shaped. Flowers in August, white or yellow, about 2 in. across, with a slender cylindrical tube about 2½–3 in. long.

P. violacea (*Nierembergia phœnicea; Salpiglossis integrifolia*).—A half-hardy S. American perennial with numerous trailing stems 6–10 in. long, erect and slightly branched near the ends. Leaves ovate lance-shaped, shortly stalked, those near the flowers in pairs. Flowers in August, of a velvety purplish-violet, funnel-bell-shaped, 1 in. or more long, with an inflated tube and a somewhat unequal limb, rather fragrant at night.

GARDEN PETUNIAS

The two species above described are included here not so much because of their value as garden plants, but rather owing to the fact that they are the parents of the large and beautiful varieties which are now so well-known. *P. nyctaginiflora* was introduced in 1823, and *P. violacea* in 1831, and in 1837—the year of Her Majesty's accession—the first hybrid between the two produced its flowers, which even then were considered to be a vast improvement on those of the natural species in size, shape, and colouring; and for more than sixty years selecting and hybridising, crossing and intercrossing of the choicest varieties have been continuously carried on. The result is that instead of having only single flowers about 2 in. across and simple in colour there are now forms 4–6 in. across, with single and double flowers, while it would be impossible to describe the innumerable shades of colour which exist, from the purest white to the deepest violet through rose, pink, purple, magenta, crimson &c., with intermediate shades in streaks, blotches, bands, and all kinds of combinations. The simple outline of the original parts has also disappeared, and in its place exist frilled, crimped, cut, and fringed varieties rivalling the double Begonia and Carnation.

At one time it was the custom to name almost every variation, but so many extraordinary forms appeared from seeds that it was impossible to keep pace with them, and only a few of the very finest and most distinct are now singled out for naming. All the large-flowering forms are known as the *grandiflora* section, which includes single white, striped, flaked, and fringed forms, and double ones called *fimbriata*, *robusta*, *Liliput* &c. Every year some new name will be found in nurserymen's catalogues, but as a rule some of the very finest forms can be obtained from a packet of mixed seeds. Any really excellent forms should be increased by cuttings, as seedlings never or rarely ever come true.

Culture and Propagation. — The cultivation of Petunias is fairly easy. They like a deep rich soil and open sunny situations, and produce charming effects in beds or borders, or trailing over the sides of vases &c. For outdoor cultivation Petunia seeds, which are very small and require to be carefully handled, may be sown very thinly, in February or March, on an even surface, and barely covered with fine sandy soil. The temperature should be about 60° to 65° Fahr. and the atmosphere should be kept fairly moist. When large enough to handle, the seedlings may be pricked off about 1 in. apart in shallow boxes or pans in a rich light soil. By April they will be ready for putting singly into small pots from which they may be transferred to the open border by the end of May or beginning of June. To make sturdy bushy plants, pinch out the tips early and gradually give more air and always plenty of light.

Cuttings of choice varieties may be inserted in sandy soil in August, and plunged in bottom heat of about 70° to 75° Fahr. When well rooted they may be shifted to cooler quarters and after a short time potted up singly. Until the frosty weather sets in they may be grown in a cold frame, but during the winter they are safer on the shelves of a warm greenhouse. In February and March the tops may be taken off and rooted in bottom heat in the same way as the cuttings in August, and thus by planting-out time two batches of plants from cuttings will be ready.

NIEREMBERGIA.—A genus containing about 20 species of dwarf creeping, diffuse or somewhat erect perennial herbs, often slender and smooth, with quite entire leaves. Flowers solitary, pale violet or white, with an expanded corolla lobe, often elegant. Calyx tubular or bell-shaped, 5-cleft. Corolla tube slender, elongated, becoming abruptly bell- or cup-shaped at the top; limb broadly 5-lobed, plaited. Stamens 5, attached at the top of the tube or slightly protruding, the top one small, the other 4 didynamous (2 long, 2 short). Fruit a many-seeded 2-celled capsule.

Culture and Propagation.—Nierembergias thrive best in a rich and somewhat heavy soil, and prefer sunny positions. For outdoor cultivation they may be grown like tender annuals and raised from seeds sown in heat about February or March, the seedlings being pricked off into pots or pans, and gradually hardened off in a cooler atmosphere and with plenty of light. They may also be increased by cuttings of the young shoots in spring, from plants that have been wintered in the greenhouse or frame or from those raised from seeds sown in autumn. Inserted in sandy soil with a little bottom heat they soon root, and may then be potted on and hardened off like the seedlings.

N. calycina.—A tender glandular and downy species, native of Buenos Ayres. Stems procumbent, bearing opposite and alternate roundish obovate stalked leaves. Flowers in August and September, white, with a yellowish tube and a yellow base.

Culture &c. as above.

N. filicaulis. — A smooth erect very slender-stemmed plant, 6–12 in. high, native of Buenos Ayres. Leaves linear lance-shaped, acute or bluntish. Flowers in May, usually lilac with a yellow centre and a slender glandular tube.

Culture &c. as above.

N. frutescens. — A handsome shrubby species 1–1½ ft. high, native of the Chilian Andes, with linear leaves 1½–2 in. long. Flowers in early summer, about 1 in. across, delicate blue shaded to white at the edges, densely produced on Flax-like stems. There is a pure white variety called *albiflora*.

Culture &c. as above. This species is as a rule hardy in the mildest parts of the British Islands when the winters are not very severe. It is wise however to make provision to reproduce it from cuttings or seeds in spring.

N. gracilis.—A beautiful tender downy species, native of Buenos Ayres, with erect stems and bluntly linear somewhat spoon-shaped leaves. Flowers produced very freely in summer, white streaked with purple, having a yellow centre and a very long tube, borne at the tips of the young branches.

Culture &c. as above. Although often grown in pots for greenhouse and conservatory decoration this is a graceful plant for the rock garden in warm sunny positions during the summer. It may be increased by seeds sown in spring and autumn, and also by cuttings in spring.

N. rivularis (*White Cup*). — A charming perennial from La Plata with slender creeping and rooting stems bearing bluntly oblong or spoon-shaped leaves varying in size. Flowers in late summer, 1–2 in. across, bell-shaped, white, with a yellowish and sometimes a rosy tinge, and having a very slender tube 1–2½ in. long.

Culture and Propagation. — This is the hardiest and best of all Nierembergias. It likes moist sandy soil and partially shaded situations where its stems can ramble freely. Grown in broad patches it is an effective plant in the rock garden or border, as its beautiful flowers which appear just above the foliage suggest a mass of Snowdrops in the distance. The plants may also be used effectively to drape the sides of pedestal vases in the centre of which taller plants are grown. It may be increased by seeds or cuttings in spring, or by detaching the rooted portions of the stem to make separate plants.

SCHIZANTHUS (Butterfly or Fringe Flower). — A genus containing about 7 species of erect annual more or less clammy herbs, all natives of Chili. Leaves often pinnately cut into incised or toothed segments. Flowers beautifully cut or fringed, variously coloured, and borne in terminal cymes. Calyx deeply 5-cleft into linear lobes. Corolla tube short or elongated, cylindrical; limb spreading, oblique, plaited, rather 2-lipped, imbricated, the lips being unequally lobed. Fertile stamens 2, attached to the top of the tube, protruding. Capsule membranous, many-seeded.

Culture and Propagation. — The Fringe Flowers may be treated as hardy and half-hardy annuals and flourish in a rich sandy loam. They are useful plants for the border or in masses or beds by themselves, producing a fine effect. Seeds may be sown in heat in February and March, the seedlings being ready for planting out at the end of May. When required for greenhouse or conservatory decoration in pots, they are best raised from seeds sown in August and September, and grown on during winter in light airy houses, or in cold frames free from frost. At the beginning of the year they may be shifted into larger pots in good rich soil, when they will develop into fine specimens, especially if fed with a little liquid manure occasionally.

S. candidus.—A pretty species about 2 ft. high, with deeply cut and divided leaves and a wealth of white irregularly cut flowers in July.

Culture &c. as above. Sow seeds in February or March, and plant out in May.

S. Grahami. — A handsome bushy half-hardy annual or biennial about 2 ft. high, with leaves once or twice pinnately cut into deep-toothed segments. Flowers in great profusion from June to October, large, lilac or rose, the under lip yellow, tinged with lilac. There is a white-flowered variety.

Culture &c. as above. Treat like *S. candidus.*

S. Hookeri is similar to *S. Grahami* in habit, height and division of the foliage, but has pale rosy flowers with a yellow upper lip, the middle lobe of the lower lip being furnished with 2 long horns. Stamens protruding.

Culture &c. as above. Treat like *S. candidus.*

S. pinnatus (*S. Evansianus; S. pinnatifidus; S. porrigens*). — A beautiful downy annual about 2 ft. high, with leaves once or twice pinnately and elegantly cut into entire, toothed, or deeply incised lobes. Flowers from June to October; lower lip light or dark violet or lilac, with a hooded, 2-cleft middle lobe; upper lip pale lilac, the middle lobe being more or less yellowish and spotted with purple, or violet.

This is the hardiest of all the Fringe Flowers, and numerous forms of it have been produced, such as *atropurpureus*, deep purple with a dark centre; *candidissimus*, a pure white variety; *roseus*, a charming variety having rosy flowers spotted with red. There is also a compact rose-coloured form and one called *Tom Thumb* scarcely a foot high, which are said to come true from seeds. *Papilionaceus* has violet flowers with deeper shades and stripes, and a spot of creamy yellow at the base of the middle lobe of the lower lip. *Priesti* is a very old white-flowered form. A packet of mixed seeds will give most of these varieties and many other variations.

Culture and Propagation. — *S. pinnatus* and its varieties being hardy are as a rule easily raised from seeds sown in the open border in March and April. They are also valuable for early spring flowering in greenhouses, for which purpose they must be raised from seeds sown in August and September.

S. retusus.—This is considered to be a variety of *S. Grahami*, and is distinguished by its less cut leaves and much larger flowers of a deep rose colour, the middle lobe of the upper lip being blotched with yellow near the apex. There is a pure white form.

Culture &c. as above. They may both be raised from seeds sown in heat in February or March and planted out at the end of May.

SALPIGLOSSIS (TRUMPET TONGUE). — A small genus of 2 or 3 closely related species of annual, biennial, or perennial, clammy downy herbs, with entire, sinuate-toothed or pinnately cut leaves. Flowers few, rather long-stalked, often rather large and handsome. Calyx tubular, 5-cleft. Corolla obliquely funnel-shaped, with a broadly bell-shaped throat; lobes 5, plaited, emarginate, erect-spreading. Perfect stamens 4, didynamous (2 long, 2 short), not protruding. Disc fleshy, somewhat 2-lobed. Ovary sessile, 2-celled; style thread-like, with a dilated disc-like or broadly 2-lobed stigma. Capsule oblong or ovoid with numerous minute seeds.

S. linearis (*Petunia intermedia*). — This species is occasionally seen. It is a native of Argentina and has linear oblong entire and purple flowers, the edges of which are paler in colour, while the tube is striped with yellow. There is a finer form called *grandiflora*.

Culture and Propagation. — This is not quite hardy in the colder parts of the kingdom. It is a perennial and grows in ordinary good and well-drained garden soil in warm situations. It may be increased by division in spring, or by seeds sown in gentle heat in the same way as recommended for the annual varieties.

S. sinuata. — This charming Chilian annual has been known at various times under the names of *atropurpurea*, *aurea*, *barclayana*, *coccinea*, *flava*, *picta*, *straminea*, and *variabilis*, all of which are really forms of the same species. It grows about 2 ft. high, the lower leaves being stalked, elliptic oblong, sinuate-toothed or pinnately cut; the upper ones more entire. Flowers during the summer months in great profusion, 2-3 in. across, variously coloured and veined, and remarkably beautiful. The names given above as synonyms indicate slightly the variety of the colour, but orange, salmon, cerise, violet, purple, crimson, and all intermediate shades are represented.

Culture and Propagation. — Perhaps there is no other annual which excites such admiration as the Salpiglossis, and it is a flower that should be seen in every garden. It is easily raised from seeds sown in heat in February and March, and planted out at the end of May or beginning of June. They do not much like transplanting, and this operation therefore should be done carefully with as little injury to the roots as possible. Or seeds may be sown in the open ground in April and May in warm open situations in good rich soil where they are to blossom. The seeds being minute should scarcely be covered with a sprinkling of fine sandy soil, and gently watered with a fine-rosed water-pot. The seedlings may be thinned out 6-8 in. apart. When grown in beds by themselves they present a truly charming sight when in bloom, so rich and variable are the colours.

BROWALLIA.—A genus containing about 6 species of smooth or downy viscid annual herbs, with quite entire membranous leaves, and blue, violet, or white flowers, borne singly in the leaf axils, or in one-sided racemes at the ends of the branches. Calyx tubular bell-shaped, 4–5- toothed or lobed. Corolla tube elongated, straight, dilated at the top, inverted from the twisting of the stalk, limb spreading 2-lipped. Fertile stamens 4, didynamous (2 long, 2 short) often with fringed filaments. Ovary shortly stalked, 2-celled, style thread-like, thickened and corrugated above, with a dilated 2-lobed stigma. Capsule membranous or somewhat leathery, more or less enclosed by the calyx. Seeds minute.

Culture and Propagation. — Browallias are elegant annuals usually grown in pots for greenhouse and conservatory decoration. Treated in the same way as other tender annuals they may be grown successfully in the open air during the summer months. They may be raised from seeds sown in heat in February and March, and transferred at the end of May or beginning of June in beds by themselves, or in broad masses in the flower border.

B. elata.—A beautiful Peruvian annual about 18 in. high with oval taper-pointed glossy green leaves, and deep blue flowers having a glandular hairy calyx. There is a variety with pure white flowers, and one called *grandiflora* with pale blue flowers larger than those of the type.

B. elata is the species generally grown for outdoor decoration, but the following may also be grown in the same way if seeds can be obtained, viz.: *B. demissa*, a Central American species 6–12 in. high, with clear pale blue flowers; *B. grandiflora*, 1–3 ft. high, native of Peru, with white or very pale lilac flowers having a greenish-yellow tube; *B. Roezli*, a dense compact species 1½–2 ft. high from the Rocky Mountains, with beautiful delicate sky-blue or white flowers with a yellow tube; and *B. viscosa* (also known as *B. pulchella*, and *B. Czerwiakowski*), a W. Indian species, 12–18 in., having deep blue flowers with a white blotch in the centre.

LXXXI. SCROPHULARINEÆ—Foxglove Order

A large order of herbs, undershrubs, or shrubs or small trees, usually scentless, but sometimes fetid, rarely aromatic, smooth or hairy, sometimes clammy. Leaves in a few genera all alternate, but in most the lower ones or all opposite or verticillate. Stipules none. Flowers hermaphrodite, mostly irregular. Calyx inferior, persistent, with 5, rarely 4, teeth or lobes. Corolla gamopetalous, sometimes almost tubeless rotate or broadly bell-shaped, sometimes with an elongated cylindrical and ventricose tube, or broadened above; limb 4–5-, very rarely 6–8-lobed, lobes equally spreading or more or less 2-lipped. Perfect stamens often 4, didynamous (2 long, 2 short), or only 2 attached to the corolla tube, and alternating with the lobes, the fifth stamen often absent or reduced to an antherless staminode. Ovary superior, sessile, entire, perfectly or imperfectly 2-celled. Style simple, entire, or 2-lobed at the apex. Fruit a capsule, rarely a berry. Seeds very numerous.

This important order contains nearly 160 genera and about 1900 species found in all parts of the world from the coldest regions to the hottest part of the Tropics.

VERBASCUM (Mullein).—This genus contains 100 to 140 species, according to various authors, of biennial herbs, rarely perennials or undershrubs, more or less clothed with a woolly or floccose down, dwarf and much-branched, the branches sometimes spiny. Often tall and erect in growth, leaves all alternate, often softly hairy, quite entire, crenulate, sinuate-toothed or pinnately cut. Flowers in simple or branched spikes or racemes at the ends of the branches, solitary or clustered in the axils of the bracts, yellow, brownish-purple, or red, rarely white. Calyx deeply 5-cleft or parted, rarely shortly 5-toothed. Corolla more or less rotate, rarely concave, with 5 broad nearly equal lobes. Stamens 5 attached to the base of the corolla, the filaments of the 3 upper or all woolly-bearded. Capsule globose oblong or ovoid with numerous wrinkled seeds.

Culture and Propagation.—The Mulleins are as easy to grow as the Foxgloves, and once they have been introduced into a garden will usually take care of themselves, appearing year after year. They flourish in any ordinary garden soil, in which seeds may be sown in spring or in autumn when ripe. The following are a few of the best Mulleins for the garden:—

V. Chaixi (*Nettled-leaved Mullein*).—A perennial species native of Central and S. Europe, about 3–10 ft. high, with green Nettle-like crenate leaves woolly beneath, the lower ones stalked, wedge-shaped at the base, upper ones sessile, rounded. Flowers in summer, yellow with purple filaments in the centre, in loose many-flowered clusters on paniculate racemes.

Culture &c. as above. Increased by seeds or division of the roots, and may be used with effect in borders or in groups in wild grassy parts.

V. nigrum (*Dark Mullein*).—A pretty British and European perennial 2–3 ft. high, with angular stems and stalked ovate-oblong, or oblong lance-shaped, often heart-shaped crenate leaves, the lower ones sometimes 1 ft. long. Flowers from June to October, ½–¾ in. across, yellow, with bearded purple filaments, borne in almost simple racemes, many in each bract-axil. There is a handsome form *album* with pure white flowers, and an Alderney variety, *tomentosum*, has woollier leaves and smaller flowers than the type.

Culture &c. as above. May be grown and increased like *V. Chaixi*.

V. olympicum.—A splendid perennial 5–6 or even 10 ft. high, native of the Levant. Leaves broadly lance-shaped, taper-pointed, woolly beneath, and in rosettes at the base. Flowers in summer, about 1½ in. across, bright golden-yellow.

Culture &c. as above. Requires same treatment as *V. Chaixi*.

V. phlomoides.—A handsome S. European Mullein 3–9 ft. bigh in deep rich soil. Leaves at the base oblong doubly incised or crenate; upper ones short blunt, or the intermediate ones somewhat angular and decurrent. Flowers in summer almost till the frost, bright yellow, in clustered racemes.

Culture &c. as above. A fine plant for groups on the grass in pleasure grounds.

V. phœniceum (*V. ferrugineum*).—A biennial species native of S. Europe, 3 ft. or more high, with ovate or oblong stalked entire or coarsely crenate leaves, smooth above, downy beneath, the upper ones being few and small. Flowers from May to August, about 1 in. across, very variable in colour—white, violet, lilac, rose, purple and red forms being in existence. A bronzy-coloured form named *cupreum* is a hybrid between this species and an orange-flowered one called *ovalifolium*.

Culture &c. as above.

V. pyramidatum.—A pretty Caucasian species 3 ft. or more high with doubly crenate leaves, the lower ones large stalked, narrowed at the base, the upper ones sessile, lobed at the base. Flowers yellow, clustered, in hoary pyramidal panicles 1–2 ft. long.

Culture &c. as above. There are several other Mulleins to be seen occasionally in botanic gardens, where they are of interest as showing the variation in the genus.

CELSIA.—A genus containing about 30 species of Mullein-like tall or dwarf, woolly or smooth, biennial or perennial herbs. Leaves alternate crenate, sinuate toothed, deeply incised or cut. Flowers yellow, purple, or red in simple or rarely branched racemes or spikes at the ends of the shoots. Calyx deeply 5-cleft. Corolla spreading rotate with 5 broad lobes. Stamens 4, 2 long and 2 short, or nearly equal, attached to the base of the corolla, the filaments often bearded. The Celsias resemble the Mulleins very much in appearance, but may be always distinguished from the latter by the blossoms having 4 instead of 5 stamens.

Culture and Propagation. — Celsias flourish in the milder parts of the kingdom in ordinary good and well-drained garden soil, but like most other plants they respond to good cultivation. In southern parts they may be raised from seeds sown in the open air when ripe, or in spring, but in less favoured spots plants may be raised from seeds sown in gentle heat about March. In this way plants may be obtained for the open border by the end of May. Where the plants are not treated as annuals in this way, they may also be increased by means of cuttings inserted in cold frames in late summer and planted out the following spring. They may be and often are grown as pot plants for the decoration of the cool conservatory.

C. Arcturus. — A pretty sub-shrubby species, 3–5 feet high, native of Crete, with lower leaves lyrate, upper ones oblong. Flowers from July to September, golden-yellow, with purple-bearded stamen filaments.

Culture &c. as above.

C. cretica.—A handsome biennial 3–6 ft. high, with downy lyrate-oblong lower leaves and ovate-oblong serrate upper ones. Flowers in June and July, bright yellow, 2 in. or more across, with a purple-red blotch at the base of the 2 upper narrower petals. There is a finer flowered form called *grandiflora*.

Culture &c. as above.

CALCEOLARIA (Slipper Flower). A genus containing about 120 species of herbs, undershrubs or shrubs with opposite or verticillate, but rarely alternate leaves, and yellow, white, or purplish flowers in terminal or axillary many-flowered panicles or cymes. Calyx 4-parted. Corolla with a very short tube; limb concave 2-lobed; upper lobe small, entire; lower one much larger, entire, concave, inflated, or slipper-shaped (popularly termed 'pouches' or 'pockets'). Stamens 2, lateral, attached near the base of the corolla; a third one very rarely present; others rudimentary or deficient. Style not thickened at the apex. Capsule ovoid-conical containing numerous small seeds.

Culture and Propagation. — Only a few natural species of Calceolaria are in cultivation, and these not very well-known except in botanic gardens. None of them appears to be hardy, although some of the shrubby kinds will stand a mild winter in the open air fairly well south of the Thames in sheltered spots. What are known as 'herbaceous' Calceolarias—beautiful plants with large tender green leaves and masses of large and elegantly blotched flowers of various colours—have been developed from the intermixing of such natural species as *C. arachnoidea*, *C. corymbosa*, and *C. crenatiflora*, all Chilian plants, probably not now in cultivation at all. Their progeny are now known in gardens under the name of *C. herbacea*, and as they all require greenhouse treatment almost from start to finish, they scarcely come within the scope of this work. It may be mentioned, however, for the benefit of those with light airy frames and greenhouses, that they are fairly easy to grow successfully. The finest plants are usually obtained from seeds sown in June, but in northern parts of the country it is wise to sow about the middle of May. A rich firm moist sandy soil should be used, and the seeds sown in either pots or pans, which must, as one of the first essentials to success, be thoroughly well-drained. The seed being minute must be sown carefully and evenly, and after a gentle watering may be covered with a sheet of glass and placed in a moist shady part of the greenhouse, or cold frame. It is a mistake to place them in too high a temperature. In nine or ten days the seedlings will appear, and as soon as the second leaf has been developed they may be carefully pricked off, about 1 in. apart, into a compost consisting of 3 parts of leaf soil to 1 of rich loam, with a fair sprinkling of silver sand. They should then be transferred to an old spent hotbed and placed near the glass, receiving a fine sprinkling overhead. For a few days they must be kept shaded from the hot sun and without air. In about a month's time they will be ready for potting singly into 2½ in. pots, and should be again shaded and sprinkled until they have recovered. In successive pottings more rich loam than before should be used—about half loam and half leaf soil with silver sand is the best compost, into which the plants may be potted rather firmly. During the winter months as little heat as possible should be given, and an abundance of air, always provided the atmosphere is genial and not too cold or frosty. In March the plants may receive their last shift into larger pots, and if they can be grown in frames with a northern aspect so much the better. On this occasion a compost consisting of 3 parts rich loam, 1 part well-decomposed leaf soil, and a sprinkling of rough charcoal and crushed oyster-shells will prove very substantial and safe. By May and June they will be a glorious mass of colour—just about 12 months after the seed was sown. One word as to selecting seedlings. Do not always discard the weak and prick out the strong. Very often weak seedlings are of a choicer or more aristocratic strain, and if carefully handled will produce flowers far superior to those of the stronger looking plants.

Greenfly and Slugs are the chief enemies of the herbaceous Calceolaria. The former may be got rid of by fumigating, the latter only by carefully watching and killing by hand. The Greenfly often get on the under surface of the leaves, and it is therefore necessary to lift these from time to time, and if any be present remove them with a small brush.

Speaking generally over-watering the plants should be avoided, and also too much feeding with liquid and other manures. A fair supply may be given, but too much promotes leaf growth at the expense of the flowers. Weak liquid manure from cows, horses, and sheep with a little soot added is an excellent stimulant, but should not be used until the pots are well filled with roots.

The shrubby Calceolarias may also be raised from seed, but they do not require such careful treatment as the herbaceous kinds. The plants so much used for bedding out in summer are usually obtained from cuttings. These are inserted in rich, very sandy, loamy soil in September and October. Plump side shoots without flower spikes make the best cuttings. The lower pair or two of leaves are stripped off, and a transverse cut made beneath a joint. The cuttings must be inserted firmly and afterwards gently watered so as to settle the soil around them. The cold frames in which they are placed should be kept close and shaded for a few days, but afterwards light and air may be given freely. During the winter frost must be kept out by means of mats or litter, but air should be given on all genial days and as much light as possible. The tops may be pinched out to make the plants bushy, and about March or April they may be potted and again grown on in frames until the end of May when they can be transferred to the flower garden. In spring cuttings of the tops may also be rooted in hotbeds in rich sandy soil, and if properly handled very few will fail. When rooted they may be transferred to boxes or placed singly in small pots. Very hot dry seasons are injurious to Calceolarias. While they do not like stagnant moisture, they also dislike a dry soil. They should then under such circumstances receive plenty of water, and if the soil is rich in vegetable manure and humus they will thrive.

The best shrubby Calceolarias for bedding are: *Bijou*, dark red flowers, very free; *Gaine's Yellow*, very free-flowering yellow variety; *General Havelock*, crimson-scarlet; *Golden Gem*, bright yellow, very free, and the kind most generally grown; *Sparkler*, crimson-gold, dwarf and compact; *Victoria*, deep maroon.

These shrubby Calceolarias are also supposed to be developed from *C. rugosa*, described below.

The following is a list of the natural species sometimes met with in gardens. They are mostly natives of the South American mountains at elevations ranging from 13,000 to 14,000 ft., and therefore very temperate and even frosty at times.

C. alba. — A lovely Chilian shrubby species 3–4 ft. high, somewhat clammy and resinous to the touch, and bearing linear remotely serrated leaves 2–3 in. long, and forked racemes of pure white flowers in June.

Culture &c. as above for the shrubby kinds. This species has proved hardy in the neighbourhood of London in warm sheltered spots near walls. Increased by cuttings in hotbeds or cold frames, or by seeds.

C. amplexicaulis.—A charming loose-growing Peruvian species 1½–2 ft. high, with herbaceous stems and ovate-oblong taper-pointed, stem-clasping, softly hairy leaves 3–4 in. long. Flowers in summer, soft lemon-yellow, in umbel-like clusters. To thoroughly appreciate the beauty of this species it should be grown in bold groups or masses.

Culture &c. as above. Increased by cuttings in gentle heat or cold frames. Also seeds. Not hardy.

C. andina. — A native of the Chilian Andes with a somewhat shrubby habit, broadly stalked, oblong ovate wrinkled leaves, and panicles of yellow flowers at the ends of the shoots.

Culture &c. as above.

C. chelidonioides.—A Peruvian annual, about 1 ft. high, with yellow flowers.

This is very rarely met with, but has been recorded in Irish gardens.

Culture &c. as above. Seeds sown in heat in early spring, and planted out in May or June.

C. fuchsiæfolia. — A handsome Peruvian species of a shrubby nature. It grows 2–8 ft. high, and has ovate serrate leaves very much resembling those of some Fuchsias. The clear yellow blossoms are borne in late summer and autumn, the two lips being almost equal, but the lower one more pouch-like than the upper.

Culture &c. as above. This species likes cool and shaded spots in the garden during the summer months, but it is not hardy enough for our winters.

C. hyssopifolia. — A shrubby Chilian species, 1–2 ft. high, with sessile linear lance-shaped acutish entire leaves. Flowers from May to August, clear yellow, whitish beneath, not hardy.

Culture &c. as above. Increased like *C. alba.*

C. kellyana. — An interesting hybrid between *C. plantaginea* and *C. Fothergilli* (the latter not now in cultivation probably) with short downy stems 6–9 in. high, and almost spoon-shaped, irregularly toothed leaves, in rosettes, all springing from the root, and more or less densely covered on both sides with soft white hairs. Flowers in summer, nearly 1 in. across, deep yellow, with numerous brown dots, 2–3 together on a stalk.

Culture &c. as above. This is a hardy plant, and may be grown in the rockery or border in well-drained sandy soil.

C. Pavoni. — A Peruvian species, 2–4 ft. high, with herbaceous stems, and perfoliate, broadly ovate, coarsely toothed, wrinkled leaves, covered with soft whitish down on both sides. Flowers from June to September, rich yellow and brown, in large terminal clusters. A hybrid named *C. Burbidgei* has been obtained between this species and *C. fuchsiæfolia.* It is a strong-growing plant with yellow flowers.

Culture &c. as above. Increased by cuttings or seeds. Not hardy, but effective during its outdoor period of blooming.

C. plantaginea. — A Chilian stemless herbaceous species, with rosettes of radical, ovate-rhomboid, serrate, downy leaves. Flowers in August, yellow, 2–3 on a hairy scape, about 1 ft. high. One of the parents of the hybrid *C. kellyana* described above.

Culture &c. as above.

C. rugosa (*C. integrifolia*).—A shrubby species, 1–1½ ft. high, native of Chili. Leaves more or less ovate lance-shaped, slightly toothed, wrinkled, rusty beneath, with winged stalks, united at the base. Flowers in late summer, yellow, in terminal panicles,

Culture &c. as above. The well-known bedding Calceolarias have been derived from this species, as stated above.

C. Sinclairi.—A straggling half-hardy herb, remarkable in being a native of New Zealand. Leaves membranous, long-stalked, 2–4 in. long, oblong or ovate-oblong, crenate toothed or slightly lobed. Flowers in June, pale lilac or flesh-coloured outside, spotted with reddish-purple within, about ½ in. across, between hemispherical and bell-shaped in outline.

Culture &c. as above. Increased by cuttings or seeds. Might prove useful for hybridising with other species or varieties in cultivation.

C. tenella. — A dwarf perennial herb, native of Chili. The whole plant is covered with a clammy down, and has broadly ovate crenate leaves about ½ in. long. The flowers are golden-yellow with a few red lines or spots.

Culture &c. as above.

C. violacea. — A shrubby Chilian species, about 2 ft. high, with stalked, ovate lance-shaped, coarsely serrate leaves, white beneath. Flowers in June, pale violet, spotted with deeper violet beneath, lip somewhat helmet-shaped, or rather the two lips opening like a mouth the interior of which is stained with yellow and spotted with purple.

C. mexicana from Mexico somewhat resembles this species, but it has flattened 'pouches' of small bright yellow blossoms in August. It should be grown in bold masses to produce any effect.

Culture &c. as above. Suitable for warm borders and parts of the rockery. May be hardy with a little protection in mild winters in the south.

ALONSOA (MASK FLOWER).—A small genus of annual or perennial herbs, or much-branched bushes, with 4-angled herbaceous branchlets. Leaves mostly opposite or ternately whorled, entire or serrate, the upper ones bract-like.

Flowers scarlet, on terminal, glandular, downy racemes. Calyx 5-parted, with narrow segments. Corolla inverted by the twisting of the pedicel, spreading, rotate, 2-lipped, almost without a tube, and having 5 lobes. Fertile stamens 4.

Culture and Propagation.—Alonsoas are easily grown in light, rich soil, either in pots or in the open border. They are increased by seeds sown in March like tender annuals, and planted out in May; or by cuttings taken in March, and inserted in sandy soil in a little bottom heat, or in August and rooted in a cold frame. Alonsoas are valuable chiefly for their brilliant and lasting effect in the flower border, and in masses with groups of other plants. Owing to their dense, compact growth they are particularly suitable for groups and should be planted about 12–18 in. apart to allow for a proper development.

A. albiflora.—A pretty Mexican species, 1½–2 ft. high, with long spikes of pure white flowers, with a yellow centre. Useful for autumn and winter flowering in the greenhouse from autumn-struck cuttings.

Culture &c. as above.

A. incisifolia (*Hemimeris urticæfolia*). A Chilian species, 1–2 ft. high, with ovate acute deeply toothed or serrate leaves, and long racemes of scarlet flowers from May to October.

Culture &c. as above.

A. linearis (*Hemimeris coccinea*).—A shrubby Peruvian species, 1–2 ft. high, with opposite or ternately whorled, linear, entire or faintly toothed leaves, the young ones clustered in the axils of the old ones. Flowers from May to October, deep scarlet, with a dark centre.

Culture &c. as above.

A. linifolia (*A. pumila*). — A Mexican species, 1½–2 ft. high, compact and bushy in growth, with dark green, linear, Flax-like leaves. Flowers from July to September or October, brilliant scarlet, produced in great abundance.

This elegant free-flowering species is effective in the border as an isolated specimen in the midst of dwarfer plants.

Culture &c. as above.

A. myrtifolia. — A beautiful bushy species, 2–2½ ft. high, native of Mexico, with deep green, glaucous leaves, 1½–2 in. long, narrow, deeply channelled, and toothed. Flowers from July to October, scarlet, but pure white in the variety *alba*.

Culture &c. as above. If lifted and carefully potted about the middle of September, and kept shaded for a few days until the plants have recovered, this species will continue to bloom in a greenhouse or conservatory well into the winter.

A. Warscewiczi (*A. compacta*). — A fine Chilian plant 1½–2 ft. high, probably only a variety of *A. incisifolia*, from which it differs in having a less branched stem, paler green leaves, and larger flowers of a brilliant scarlet or rose-vermilion, mostly without a deeper shade in the centre, and produced in longer spikes from July to October. The variety called *compacta atrococcinea* grows only about half as high, and has a more erect and compact habit with toothed leaves 2–2½ in. long, and long spikes of beautiful coppery-rose, the 5 lobes of the corolla being all well developed.

Culture &c. as above.

DIASCIA.—A genus with 20 species of slender annual or perennial herbs, with the lower and nearly all the leaves opposite. Calyx 5-parted. Corolla almost tubeless, spreading or concave, 2-lipped, the upper one 2-cleft, the lower one 3-cleft, the side ones being spurred. Stamens 4, didynamous (2 long, 2 short).

D. Barberæ. — A slender-growing S. African annual with 4-angled stems 1–2 ft. high. Leaves ½–¾ in. long, opposite, shortly stalked or nearly sessile, wedge-shaped cordate, with a few sharp teeth near the base at each side. Flowers in July and August, deep pink, the lower lobe much larger than the others, and in conjunction with the 2 side lobes produced into 2 curved purple spurs ½–1 in. long behind.

Culture and Propagation. — This species may be raised from seeds sown in heat in March, the seedlings being transplanted about the end of May. It is probably the only one in cultivation and may be used in the same way as the Alonsoas in the open border or in pots for greenhouse decoration.

NEMESIA. — A genus containing about 20 species of slender-growing annual or perennial herbs, sometimes bushes, with opposite leaves, and variously coloured flowers in racemes at the ends of the branches, or rarely solitary in the leaf axils. Calyx 5-parted. Corolla tube produced into a sac or spur, 2-lipped. Stamens 4, didynamous (2 long, 2 short).

Culture and Propagation.—Nemesias very much resemble the Diascias in appearance and flowers. Those in cultivation may be raised from seeds sown in heat in early spring, or in the open border in April and May, and even later for a succession of bloom. They flourish in ordinary soil and look best when grown in broad patches. They will flower in winter and early spring in greenhouses from autumn-sown seeds. They are all natives of S. Africa.

N. **cynanchifolia.** — A pretty square-stemmed annual 1½-2 ft. high, with ovate lance-shaped, remotely toothed leaves, and masses of rich lilac-blue flowers produced during the summer and autumn.

Culture &c. as above.

N. **floribunda.** — A handsome annual about 1 ft. high, bearing stalked and unstalked leaves and racemes of white and yellow fragrant flowers.

Culture &c. as above.

N. **strumosa.**—A beautiful species 1–2 ft. high with oblong lance-shaped leaves and trusses of rich orange flowers at the ends of the stems. There are several colour variations, including white, pale yellow, crimson, pink, orange, and numerous intermediate shades and combinations.

Culture and Propagation. — This is very effective grown in beds on lawns. Seeds may be sown in early spring in heat, the seedlings being pricked into shallow boxes when large enough, and from thence to the open ground at the end of May or beginning of June.

N. **versicolor.**—A pretty plant 6–12 in. high, with ovate stalked leaves, the upper ones being few, unstalked, and oblong lance-shaped or linear. Only comparatively few blue, lilac, or yellow and white flowers are borne on the racemes during summer. The variety *compacta* is much more dense in growth, and has narrower leaves and more heavily laden trusses of violet or pale rose flowers.

Culture &c. as above. Treat like *N. strumosa.*

LINARIA (TOADFLAX).—A large genus (about 180 species) of herbs, rarely shrubs, with opposite or whorled leaves, the upper ones rarely all alternate, entire, toothed, or lobed. Flowers solitary and axillary, or the upper ones often in spikes or racemes. Calyx 5-parted. Corolla personate, 2-lipped, the tube produced into a spur, upper lip erect, lower one 3-lobed, the middle being smallest. Stamens 4, didynamous (2 long, 2 short). Capsule ovoid or globose, many-seeded.

Sometimes as in the case of *Linaria peloria*, a variety of the Common Toadflax (*L. vulgaris*), the flowers are perfectly regular, having 5 spurs and lobes and 5 fertile stamens, the corolla being like a narrow extinguisher in shape with a rounded top (see Glossary, fig. 80).

Culture and Propagation.—The Toadflaxes are of very easy culture in ordinary garden soil in rather dry and sunny situations, many of them being very ornamental in the rockery, the margins of borders and shrubberies, on old ruins, walls &c., according to habit and height. The perennial kinds are easily increased by dividing the tufts in early autumn or early spring. Seeds may also be sown in spring or in autumn as soon as ripe. The annual species are raised from seed sown in spring either in cold frames or gentle heat according to the tenderness of the species, or in the open ground. When seeds of tender species are sown in autumn the plants require the protection of cold frames during the winter. Many of the perennial kinds are also easily increased by means of cuttings of the non-flowering shoots inserted in sandy soil in cold frames at the end of summer or early autumn. They root freely and may be transferred to the open border the following spring in mild weather.

Of the many species known, the following is a list of the kinds most ornamental and useful for the flower garden:—

L. **alpina.**—A beautiful bushy perennial about 6 in. high, native of the Alps and Pyrenees, with more or less linear lance-shaped, thickish, silvery-tinted or glaucous leaves, 4 in a whorl. Flowers in summer in close racemes, bluish-violet with a bright golden centre and an acute spur, sometimes straight, sometimes curved. The variety *alba rosea* has very pale pink flowers.

Culture and Propagation. — An excellent plant for the rockery or edges of borders in sandy soil. Increased by seed or division. In favourable spots it will sow its seeds freely and appear year after year as in a naturalised state.

L. **anticaria.** — A pretty Spanish perennial about 6 in. high, forming tufts of trailing shoots furnished with small linear fleshy grey-green leaves. The flowers, which are freely produced in the summer months in short racemes at the ends of the shoots, are whitish in colour tinged with lilac-purple, and more deeply veined.

Culture &c. as above. This is best raised annually from seeds, or by means of cuttings rooted in cold frames in early autumn. It likes warm light soil.

L. antirrhinifolia.—A handsome little species 6–8 in. high, forming dense tufts 2 ft. or more across, and producing masses of bright purple flowers during the summer and autumn months.

Culture &c. as above. Excellent for the rock garden in free sandy soil. Increased by seeds, cuttings, or division.

L. aparinoides.—A very variable annual species, native of N. Africa and Central and S. Europe. It grows about 18 in. high, having dense tufts of erect stems more or less branching at the base, and bearing linear or awl-shaped leaves. Flowers in summer in short downy clusters, sulphur-yellow with blackish stripes.

Culture and Propagation.—Although a comparatively new plant to cultivation there are already several forms of it—the result of crossing with other species, such as *maroccana*, perhaps—or merely seminal variations. The most distinct seems to be the one called *splendens*, which comes fairly true from seeds. It grows 10–12 in. high, and has warm bronzy-violet flowers with a yellow blotch in the centre. There is another called *aureo-purpurea* with short racemes of crimson-purple flowers having a yellow palate. Increased by seeds sown in spring in cold frames and transplanted in May.

L. bipartita (*L. elegans*).—A charming Algerian annual 1–1½ ft. high with greyish stems and alternate, glaucous, linear lance-shaped leaves. Flowers from June to September, produced on an elongating spike, and varying from reddish-violet to purple-rose, washed and striped with deeper shades, with a whitish centre blotched with purple or rose, and a linear recurved spur behind. There is a variety *alba* having yellowish or greenish-white flowers.

Culture &c. as above. It requires treatment similar to *L. aparinoides.* Suitable also for the rock garden in well-drained, gritty soil.

L. bipartita and its variety are also excellent plants for massing in beds or groups, in the centre of which taller plants may be grown.

L. Cymbalaria (*Ivy-leaved Toad-flax; Kenilworth Ivy; Mother of Thousands*).—A well-known charming British perennial often seen covering old walls, ruins, brickwork &c., in dry, sunny positions. It has slender trailing branches 6–24 in. long, and somewhat fleshy, broadly kidney-shaped leaves, irregularly 3–7- angled or lobed, and ½–¾ in. across. Flowers from May to September, ⅓ in. across, bluish-purple, lilac, or white, with a yellow centre and short spurs. Besides the white-flowered variety, which is very handsome, there is also one with variegated foliage.

Culture &c. as above. Once established in a garden this species may be trusted to look after itself, and will sooner or later find a situation that suits it better than any other. It may also be grown in hanging pots or baskets. The white variety makes a charming pot plant.

L. dalmatica.—A handsome, robust perennial 3–5 ft. high, native of S.E. Europe, having erect or decumbent branches, densely clothed with oblong or linear lance-shaped, glaucous leaves. Flowers in summer, large, pale yellow, with a straight spur, in branching spikes.

Culture &c. as above. This species flourishes in warm, sunny places, in light sandy soil, and spreads vigorously when once established. Increased by seed, cuttings, or division.

L. genistæfolia.—A vigorous perennial 2–4 ft. high, native of S.E. Europe and Asia Minor, with smooth, branching stems, and somewhat clasping, lance-shaped acute, 3–5-nerved leaves, 1–2 in. long. Flowers in summer and autumn, pale yellow with a straight spur, and borne in loose racemes.

Culture &c. as above. Requires similar treatment to *L. dalmatica.* There is a Flax-leaved form called *linifolia.*

L. hepaticæfolia.—A very dwarf, dense-growing Corsican perennial, 1–2 in. high, with smooth, heart-shaped, reniform, 3–5-lobed leaves, resembling those of the common *Anemone Hepatica.* Flowers in summer and autumn, lilac-purple, produced very freely.

Culture &c. as above. Suitable for

warm sunny parts of the rockery, where it forms dense cushions. Increased by seeds, cuttings, and division.

L. macedonica.—A distinct and beautiful species from S.E. Europe, 2–3 ft. high, with rather broadly oblong or linear lance-shaped leaves, and bright yellow flowers with a deeper coloured centre or palate and a long conical spur.

Culture &c. as above. Increased by seeds, cuttings, or division.

L. macrura.—A pretty species 1–1½ ft. high, native of Asia Minor &c., with flat linear glaucous leaves. Flowers in summer and autumn, yellow, with a deeper coloured hairy centre, in long dense racemes. Recognised by the long straight spur.

Culture &c. as above. Suitable for rookery or border, and increased by seeds, cuttings, or division.

L. maroccana.—A pretty little annual about 9 in. high, native of Marocco, with linear leaves sometimes whorled. Flowers in summer, in long racemes, bright violet-purple, with a whitish centre blotched with yellow. There is a variety called *rosea*, with deep carmine-rose flowers, more ornamental than the type; there are also variations having white, rosy, and lilac flowers, to which the name *hybrida* has been given.

Culture &c. as above. They may all be grown and increased like *L. aparinoides* and *L. bipartita.*

L. multipunctata.—A charming miniature Spanish annual, forming dense tufts scarcely exceeding those of *L. alpina* in height. The stems at first decumbent, then ascending at the extremities, are slender and thread-like, bearing narrow glaucous leaves. Flowers in summer and autumn in great profusion, in terminal spikes, of a beautiful citron-yellow, with an orange centre, densely dotted with brown, and having a copper-coloured spur. The variety *erecta*, which is said to come true from seeds, grows in dense compact tufts, is not only valuable for the margins of borders and rockeries, but also makes a fine pot plant.

Culture &c. as above. Obtained by sowing seeds in cold frames and transplanting in May, or by sowing in the open ground in April.

L. origanifolia.—A charming little rock plant 6–8 in. high, native of the Pyrenees, with erect much-branched stems and oblong leaves. The flowers appear from June to October, and are bluish-violet varying to purple and sometimes white. The variety *crassifolia* has larger beautiful blue flowers with a yellow centre and broader and sharper pointed leaves.

Culture &c. as above. Although not quite hardy in all parts of the kingdom, this species is easily increased by seeds sown when ripe in cold frames, or by means of cuttings inserted in sandy soil at the end of summer.

L. pallida.—A pretty little Italian species 2–3 in. high with glaucous leaves, heart-shaped in outline, but cut into 3–5 lobes. The pale blue sweetly scented flowers appear from July to September, and are very effective.

Culture &c. as above. Although handsome this species is apt to become a nuisance if grown near choice plants. Its roots creep along beneath the surface for a considerable distance and throw up shoots all over the ground. It is thus more suitable for wild parts of the garden on old banks or ruins in rather damp situations.

L. purpurea.—A pretty species 1–3 ft. high, native of S. Europe, but now naturalised in many parts of Britain, growing on old walls and dry places. Leaves slightly glaucous, 1–1½ in. long, linear, lower ones in whorls of from 4 to 9, upper ones 3 in a whorl. Flowers in summer, in long loose racemes, bluish-purple, the mouth of the corolla bearded with white hairs along the edges, and the tube striped with purple. Spur curved, as long as the corolla.

Culture &c. as above. Increased by seeds sown naturally. The plants may be left to look after themselves when once established.

L. reticulata.—A pretty Portuguese annual 2–4 ft. high, with linear channelled leaves, lower ones whorled, upper ones scattered. Flowers from May to July, deep purple, veined, with a bronzy or yellow centre, marked with deep purple lines, and borne in short, dense, downy racemes. The variety *aureo-purpurea* has deep, rich purple and orange flowers, the contrast between the two colours being very striking and effective.

Culture &c. as above. Increased by seed sown in spring.

L. saxatilis.—A pretty trailing Spanish perennial, covered with a clammy down, and having thickish, more or less linear lance-shaped leaves, the lower ones 4 in a whorl, the upper ones alternate. Flowers late in summer, yellow, with 2 brownish spots or lines in the centre.

Culture &c. as above. Suitable for trailing over ledges in the rockery. Increased by seeds, cuttings, and division.

L. spartea. — A pretty erect-growing branched annual, native of the Western Mediterranean region, having linear lance-shaped erect leaves, the lower ones often in whorls of 3, the upper ones alternate. Flowers in summer and autumn, deep yellow, long-stalked, in smooth or clammy downy racemes.

Culture &c. as above. Raised from seeds sown in the open border in April.

L. triornithophora. — A beautiful perennial 12–18 in. high, with erect branches decumbent at the top, and furnished with smooth, lance-shaped acute leaves. Flowers from June to September, 3 or 4 in a whorl, purple with a yellow centre, long spurs, and an inflated and striped tube.

Culture &c. as above. Although a perennial it is safer to raise this species annually from seeds sown in spring or autumn in cold frames, especially in the bleaker parts of the country. It is also easily increased by inserting cuttings of the flowerless shoots in sandy soil in cold frames at the end of summer, and keeping them protected from frost until the following spring.

L. vulgaris (*Common Toadflax*).—A beautiful British perennial 1–2 ft. high, with a creeping rootstock, and glaucous linear or lance-shaped leaves 1–3 in. long, often in whorls. Flowers from July to October, in dense racemes, ¾–1 in. long, pale yellow or citron with a copper-coloured centre, and curved spur as long as the corolla. The variety *peloria* referred to above in the generic description is a beautiful plant with regular extinguisher-like flowers. It retains its regular character in a cultivated state, but is rarely met with growing wild.

Culture &c. as above. Grown in masses in the border or rockery, the Common Toadflax and its variety *peloria* are very beautiful. They thrive in dry sunny positions and may be increased by division. The common variety seeds freely and will reproduce itself naturally under favourable circumstances.

ANTIRRHINUM (SNAPDRAGON).—A genus containing about 25 species of annual or perennial herbs, rarely undershrubs, sometimes climbers. Lower leaves rarely all opposite, upper ones often alternate, entire or rarely lobed. Flowers often showy, purplish, yellow, or white, solitary in the axils of the cauline bract-like leaves, or in racemes at the ends of the branches. Calyx 5-parted; corolla personate, saccate or gibbous, not spurred; upper lip erect shortly 2-lobed; lower one spreading 3-lobed, the middle lobe the smallest; 'palate' bearded closing the throat. Stamens 4, didynamous; stigma shortly 2-lobed. Capsule ovoid or globose, 2-celled, the upper cell bursting by one pore, the lower by 2 many-toothed pores.

The Snapdragons are as easily grown as the Toadflaxes, but require somewhat richer and moister but well-drained soil. There are several species in cultivation but none of them compare in beauty, grace, and value with the greater or Common Snapdragon (*A. majus*), for the ornamentation of beds, borders, or rock gardens, nor are they much grown except in botanical gardens.

Culture and Propagation.—All Snapdragons may be grown and increased much in the same way, but the following remarks, while general, apply more particularly to *A. majus* and its varieties. Seeds may be sown in gentle heat about February, the seedlings being pricked out into pans or singly into small pots and grown on with as much light and air as possible when thoroughly established. By May they will be fit for transplanting to the open ground, and if grown in groups or masses should not be nearer to each other than 12 or 18 inches, according to the bushiness and freedom of the variety. Similar results can be obtained by sowing in a warm sheltered border in March and April, transplanting at the end of May or beginning of June. The next period of sowing is when the seeds are thoroughly ripe—about August and September. In most parts of the country the seeds may be sown in the open border at this period, choosing warm sheltered positions, as the seedlings will have to pass through the winter. It is safer, however, if possible, to shelter them in a cold frame during the winter months. They will make fine sturdy specimens by the following spring, when they may be transplanted in mild weather. By sowing seeds at the various times mentioned plants can be obtained in bloom at different periods—from spring till the end of autumn.

When it is desired to increase certain choice varieties the safest plan is to take cuttings of the short plump flowerless shoots in September, and insert them in sandy soil in a cold frame or under a handlight, when they will soon root and be fit to stand the winter well. Cuttings of the young growths may also be rooted in gentle heat in spring, and planted out in May or June.

Besides their value as border plants, Snapdragons of late years have been grown extensively in pots, and look remarkably fine. The dwarfest varieties are the most suitable for this purpose, and many of the pure self- or uniformly coloured varieties are charming.

A. Asarina.—A greyish clammy S. European herb with trailing stems rising up at the ends 3–4 in. high, and having opposite long-stalked heart-shaped, crenate, 5-lobed leaves. Flowers in summer, pale yellow or white, 1½ in. long, sometimes tinged with red. Calyx segments hairy.

Culture &c. as above. Requires sunny sheltered parts of the rock garden in warm well-drained sandy loam.

A. majus (*Common Snapdragon*).—A beautiful British and European perennial 6–24 in. high, with oblong lance-shaped or linear leaves 1–3 in. long. Flowers from July to September in dense racemes, 1½ in. long, variously coloured—purple, white, yellow, or crimson being the prevailing tints, with a yellow 'palate.'

The garden varieties of Snapdragon are innumerable, but they are roughly classed into three main groups, according to their height, viz.:—tall, medium; and dwarf or 'Tom Thumb' varieties. There are well-marked forms in each group, but many others which serve as connecting links between one and the other, and the division therefore is purely arbitrary. When ordering seeds, however, it is well to say which section is required. The colours in each group vary from the purest white to the deepest maroon and brightest yellow, and there are also many fine striped and variegated forms. A packet of mixed seed from each group will give an endless variety for ordinary garden purposes. The Tom Thumb forms are useful for edges to borders and may rank for this purpose with the dwarf shrubby Calceolarias, Ageratums, Violas &c., while the medium and taller varieties make handsome groups by themselves—especially if the colours are not mixed.

An interesting fact connected with Snapdragons is that the colour of the stems indicates in a measure what the colour of the flowers is likely to be. Thus plants with pale or bright green stems and leaves indicate white or pale yellow flowers, while on the contrary those with dark green stems more or less heavily tinged with red or purple usually produce flowers having crimson, scarlet, purple, and similar shades of colour. This peculiarity is also noticeable in Phloxes and Pentstemons.

Other kinds of Snapdragon are *molle*, with whitish flowers and a yellow centre; *Orontium*, a rose or white British variety found in cornfields &c.; *siculum*, white or yellow; *rupestre*, rosy-lilac; and *tortuosum*, which has very large purple flowers.

Culture &c. as above.

PHYGELIUS (Cape Figwort).—A small genus (only 2 species have been described) of very smooth erect shrubs, with opposite, stalked, crenulate leaves, gradually passing upwards into alternate bracts. Calyx 5-parted. Corolla tube elongated, incurved or nearly straight, limb more or less oblique, with 5 rounded nearly equal, spreading lobes. Stamens 4, didynamous, protruding and bent downwards.

P. capensis.—A beautiful showy S. African perennial 3–4 ft. high, with angular or slightly winged purplish stems, and opposite stalked, ovate lance-shaped crenate-toothed leaves, 3–4 in. long, deep dark shining green above, and very pale or greyish beneath. Flowers from June till October, scarlet, tubular, drooping, in forked cymes, about 1½ in. long, with an oblique mouth and protruding stamens and stigma.

Culture and Propagation.—This is the only species grown at present. It flourishes in rich loamy soil, and in northern parts of the country should be planted in warm sheltered spots near walls or hedges, although in the south such precautions are unnecessary. It may be increased from seeds (which are freely produced) sown in a hotbed in spring and transplanted in May. In early spring the rootstock may also be carefully divided, or cuttings of the young shoots may be inserted in sandy soil with a little bottom heat in spring, or in cold frames during the summer months.

PAULOWNIA.—This genus contains only one species:—

P. imperialis.—A beautiful and ornamental Japanese tree 30–40 ft. in the most favoured parts of the South of England, forming dense rounded heads. Leaves opposite, entire or 3-lobed, broad, soft, hairy or downy, ovate-heart-shaped in outline, and often 12–20 in. long, and correspondingly broad. Flowers in spring, sweet-scented, tubular, somewhat like those of the Foxglove but larger, purplish-violet, with deeper reddish-brown spots inside, and produced in many-flowered terminal panicles. Calyx deeply 5-cleft, with thick obtuse lobes. Corolla tube elongated, curved, widening at the mouth, with 5 obliquely spreading rounded almost equal lobes. Stamens 4, didynamous, bent down at the base, then ascending.

Culture and Propagation. — This beautiful tree likes a light but deep loamy soil, and does not flourish in very sandy or stiffish clay soil. As an ornamental tree it is very effective, and when the flowers are not injured by frost they present a very fine sight. In Paris several avenues of the Paulownia may be seen, and it makes a splendid shade tree in summer. By cutting young trees back at the beginning of the year, strong thick shoots 6 ft. or more long will develop in the course of the season. Except in the bleakest and wettest parts of the country, the Paulownia seems to be fairly hardy, and it has not been injured by 18° of frost in the north of England.

The Paulownia is raised from seeds sown in gentle heat or a cold frame in spring. It may also be increased by cuttings of the ripe wood inserted in rich sandy soil in cold frames or slight heat in early autumn. The roots cut into pieces about 2 in. long or less and placed in bottom heat will also produce young plants at the beginning of the year.

CHELONE (Turtle Head). — A small genus of smooth or scarcely downy perennial herbs with opposite serrate leaves. Flowers in dense spikes in the axils of the upper leaves and at the ends of the branches, sessile. Calyx 5-parted with lance-shaped or broadly ovate segments. Corolla tube rather long, inflated, limb 2-lipped, gaping. Stamens 4, didynamous. Capsule many-seeded; seeds winged.

Culture and Propagation.—Chelones flourish in a rich and rather light loam, but grow well in ordinary good garden soil. They may be increased by dividing the plants in the early autumn as soon as the flowers have disappeared, and the foliage shows signs of decay. Seeds may be sown when ripe in cold frames, the seedlings being planted out in spring. Cuttings of the young shoots may also be inserted in sandy soil in cold frames in spring and during the summer. Cuttings of the roots will also grow inserted in and covered with sandy soil, with a little bottom heat in the early part of the year.

C. Lyoni (*C. major*).—A showy perennial, 3–4 ft. high, native of Upper Carolina and Georgia, with stalked heart-shaped ovate serrate leaves, very smooth, and deep green. Flowers from July to September, purple, in clustered spikes at the tips of the branches.

Culture &c. as above. A good border plant.

C. nemorosa. — A native of N.W. America, about 1 ft. high, and interesting as forming the connecting link between *Chelone* and *Pentstemon*. Leaves ovate taper-pointed, serrate. Flowers in summer, rosy-purple, 1–3 on a downy stalk.

Culture &c. as above.

C. obliqua (*C. glabra; C. purpurea*). A pretty N. American species, 2–3 ft. high, not quite so vigorous in growth as *C. Lyoni*. Leaves stalked or nearly sessile, oblique, oval lance-shaped, unequally toothed, very smooth. Flowers in summer, large, purple, in dense spikes at the ends of the branches.

Culture &c. as above.

PENTSTEMON (Beard Tongue). This genus contains 66 species of perennial herbs or undershrubs with opposite leaves, the lower ones stalked, the upper ones often sessile, stem-clasping and gradually passing into bracts. Peduncles forked, many-flowered, arranged in terminal panicles or clusters, often leafy at the base. Calyx 5-parted. Corolla showy, red, violet, blue, white, or rarely yellowish-white, with a tube often elongated, equal or inflated in the middle, and 2-lipped; upper lip 2-lobed, lower one 3-cleft.

bearded or naked within. Stamens 4, didynamous, the fifth unfertile stamen (or staminode) thread-like, with a club- or spoon-shaped tip, usually shorter than the 4 fertile stamens. Capsule many-seeded, opening by valves; seeds wingless.

Next to the Phloxes (p. 658) few border plants are such favourites as the Pentstemons. They are graceful in habit and free in flowering, and make the garden look cheerful and bright from June until the late autumn frosts set in, by the great range of colouring they display from blush-white, through pink, salmon, rose and scarlet to violet and purple. Several natural species are described below, but the plants usually seen in gardens have been derived by hybridisation chiefly from *P. Hartwegi* and *P. Cobæa.*

Culture and Propagation. — Pentstemons enjoy a deep rich sandy loam, enriched with well-decomposed manure. The drainage should be perfect, as the roots dislike stagnant moisture. They are increased in three ways—by seeds, cuttings, and division, the two first methods being most generally practised. Seeds—which are produced freely in favourable seasons—should be sown early in February in a gentle hotbed, the seedlings being pricked out when large enough to handle, and kept in the hotbed until they have thoroughly recovered from being disturbed. Afterwards they may be transferred to cooler positions, such as a cold frame where they can obtain plenty of light and air and yet be protected from the spring frosts. By the end of May they will be fine sturdy plants for transplanting to the flower border, and in autumn—or about 6 months from the date of sowing the seed—they will be in bloom. If the plants have been treated well and allowed plenty of room to develop, their stems will be strong enough to support themselves without the aid of stakes.

Seed may also be sown as soon as ripe in cold frames so as to obtain large and sturdy plants early the following spring. Plants obtained in this way will flower before those raised from spring-sown seeds.

Cuttings of the young shoots root freely in sandy soil in a little heat or a cold frame in early spring, or in autumn simply in cold frames. Those of the latter period may be wintered in cold frames and planted out the following May or even April in the milder parts of the country.

Many of the species, chiefly those of dwarf tufted habit like *barbatus*, *glaber*, *procerus*, are readily increased by division of the roots, but many others will not stand this treatment well, and are best raised from seeds or cuttings.

The following is a list of the species met with in cultivation, but some are very rare. They are mostly natives of the United States and N.W. America generally, except where otherwise stated.

P. antirrhinoides.—A greyish much-branched perennial 9–18 in. high, with lanceolate spoon-shaped or oval leaves, rather small, entire, and slightly stalked. Flowers in summer, lemon-yellow, unbearded, except the sterile stamen.

Culture &c. as above. This species is rather tender except in warm sheltered borders. It may, however, be raised every year from seeds or cuttings and planted out in May as an annual.

P. azureus. — A smooth glaucous Californian perennial about 1 ft. high, with leaves varying in shape from oblong spoon-shaped below to broadly heart-shaped ovate or lanceolate, becoming smaller and narrower upwards. Flowers in late summer, 1–3 on a stalk, beautiful sky-blue, reddish-purple at the base of the tube, over 1 in. long.

Culture &c. as above.

P. barbatus (*Chelone barbata; C. ruelloides*). — A handsome densely tufted Mexican species with entire lance-shaped leaves. Flowers from June to October, on tall spikes 2 3 ft. high, drooping and varying from pinky-red to carmine, the lower lip being conspicuously bearded at the mouth. There is a white variety *albus*; a flesh-coloured one, *carneus*; and a vigorous one named *Torreyi* which grows taller and is remarkable for having usually unbearded scarlet-red flowers.

Culture &c. as above. This species may be increased by dividing the tufts in early spring or autumn; also by cuttings and seeds.

P. breviflorus.—A slender twiggy Californian species with more or less oblong lance-shaped, somewhat finely toothed leaves about 1 in. long, seldom if ever in whorls. Flowers in September, yellowish, or flesh-coloured, about ½ in. long, striped with pink inside, the upper lip furnished with a clammy beard.

Culture &c. as above.

P. campanulatus (*P. angustifolius; P. atropurpureus; P. elegans; P. pulchellus; P. roseus; Chelone campanulata*).—This beautiful Mexican perennial, which is unfortunate in having so many synonyms, grows about 18 in. high, and has sessile linear lance-shaped serrate leaves, the upper ones being slightly downy and clammy to the touch. Flowers from June to October, varying from rose to violet, purple &c., the sterile stamen being slightly bearded.

Culture &c. as above. This is a very old garden plant, and numerous forms of it have appeared, which account for the diversity in naming. Increased by seeds and cuttings.

P. centranthifolius (*Chelone centranthifolia*).—A beautiful species about 2 ft. high with oblong lower leaves, and obovate or lance-shaped stem-clasping upper ones. Flowers in summer, about 1 in. long, bright carmine.

Culture &c. as above. Increased by seed or division.

P. Cobæa. — A beautiful and very distinct perennial 1–2 ft. high, native of Texas, with large glossy oblong or ovate lance-shaped leaves about 8 in. long, the upper ones sessile and sharply serrate, the lower ones narrowed into a stalk with a few blunt teeth at the apex. Flowers late in autumn, numerous, pale mauve and white, with or without purple stripes and spots in the throat and lobes. Calyx large, bell-shaped, 5-toothed. Corolla about 2 in. long, broadly tubular, inflated, with 5 broad blunt spreading lobes.

Culture and Propagation. — This species requires to be grown in warm sheltered spots and is probably not very hardy north of the Thames. It makes a splendid greenhouse plant grown in pots, and may be had in bloom in November and December. Increased by seeds or cuttings.

P. confertus.—A smooth stiffish growing species 6–18 in. high. Lower leaves oblong spoon-shaped, the upper ones oval lance-shaped stem-clasping. Flowers from May to July, in an almost cylindrical cluster, pale sulphur-yellow, each one being about ½ in. long. The variety *cæruleo-purpureus* (perhaps better known as *procerus* and *micranthus*) has bluish-purple flowers and very variable sepals. It is a rather better garden plant than the typical *P. confertus*, and is very hardy in ordinary garden soil. It seeds freely and flowers earlier than any other species—except perhaps *P. campanulatus*.

Culture &c. as above. Increased by division or seeds.

P. diffusus. — A somewhat downy species 2–4 ft. high, with more or less ovate lance-shaped leaves, the upper ones being thick, heart-shaped, stem-clasping, and serrate. Flowers in summer and autumn in large loose many-branched clusters, violet-purple, about 1 in. long, the sterile stamen bearded at the top.

P. argutus, with bright purple flowers, having a sky-blue lower lip, and *P. Richardsoni*, with violet flowers, both appear to be varieties of this species, or are very closely related.

Culture &c. as above. They may be increased by seed or division.

P. Digitalis (*Chelone Digitalis*).—A handsome free-growing perennial 1–2 ft. high, closely related to, if not indeed a variety of, *P. lævigatus*, but quite disinct enough for garden purposes to have a single name. Leaves smooth glossy, slightly serrulate, lance-shaped, 3–6 in. long and covered with small dots, the upper ones ovate lance-shaped, perceptibly narrowed. Flowers in summer, numerous, white; corolla over 1 in. long; sterile stamen sparsely bearded.

Culture &c. as above. Increased by seed and division.

P. glaber (*P. erianthera; P. Gordoni*). — A very smooth and handsome perennial 6–24 in. high, with tufts or rosettes of entire somewhat glaucous ovate lance-shaped leaves, the lower ones more or less narrowed into a stalk, the upper ones linear-lance-shaped sessile. Flowers in summer, in clustered panicles, purple, violet, or blue; the sterile stamen slightly bearded near the top.

The plant known as *P. cyananthus*, and its improved form *Brandegei*, are varieties of this species, distinguished by their broad heart-shaped ovate leaves, the upper ones taper-pointed, and large dense clusters of bright blue flowers produced in May and June, before those of the type.

Culture &c. as above. This species may be grown in the rockery as well as the flower border proper. It is increased by seeds, cuttings, and division.

P. gracilis. — A slender-stemmed species 1 ft. or less high, with spoon-shaped or oblong leaves, the upper ones mostly linear lance-shaped about 1 in. long. Flowers in August, lilac-purple or whitish, about 1 in. long, tubular funnel-shaped or nearly cylindrical.

Culture &c. as above. Suitable for the rockery or border. Increased by seeds or cuttings.

P. grandiflorus. — A distinct and showy species about 3 ft. high, with the upper leaves roundish, stem-clasping, or connate-perfoliate. Flowers in July, purple, 1½ in. long, the sterile stamen hooked, shortly dilated and scarcely bearded at the apex.

Culture &c. as above. Increased by seeds and cuttings.

P. Hartwegi (*P. gentianoides*). — A splendid garden perennial 2–3 ft. high, with smooth bright green lance-shaped leaves, or the upper ones widened and stem-clasping at the base, tapering to a point. Flowers in summer and autumn, scarlet or blood-red, tubular-funnel-shaped, about 2 in. long, with spreading lobes; sterile stamen beardless. — There are several varieties of this species, and distinctive names like *coccineus*, *cæruleus*, and *grandiflorus*, which explain themselves, have been applied, but a packet of mixed seeds will probably supply them all and many others besides. Many — indeed most — of the garden Pentstemons are supposed to be derived from this species, and fancy names have been given to many of them by florists, to whose catalogues reference may be made.

Culture &c. as above. *P. Hartwegi* and its varieties form fine bushes, but will not thrive on cold soils. In warm well-drained soils they become perennials and shoot up every spring. The first plant of *P. Hartwegi* to flower in England was at Walworth in September 1837, and was said to have been obtained from Belgium.

P. heterophyllus. — A somewhat shrubby species about 18 in. high, with a smooth or frosted appearance, and entire linear lance-shaped leaves. Flowers in summer, pink or rosy-purple, over 1 in. long, inflated, funnel-shaped above, solitary or 2–3 in the axils of the upper leaves, and borne in twiggy racemes.

Culture &c. as above. This species varies a good deal when raised from seeds and it is not quite hardy in unfavoured parts of the country. Young plants from seeds or cuttings are therefore safest under the protection of a cold frame in winter.

P. humilis. — A distinct Rocky Mountain species 8–9 in. high, forming compact tufts, and having more or less linear lance-shaped leaves. Flowers early in June, large, blue, tinted with reddish-purple, and borne in upright clusters.

Culture &c. as above. Owing to its dwarf and compact growth this little species is a very desirable plant for the rock garden. It likes a sunny position, and flourishes in sandy loam and leaf soil, with plenty of water during the hot summer months. Increased by seeds or cuttings.

P. jaffrayanus. — A handsome Californian species 12–18 in. high, with glaucous oblong lance-shaped leaves, the lower ones narrowed into a stalk, the upper ones broader and stem-clasping at the base. Flowers in July and August, shortly stalked, 1–2 on each pedicel forming an interrupted or irregular cluster 4–8 in. long; corolla beautiful gentian-blue, bell-shaped, with a very wide tube and reflexed lobes.

Culture and Propagation. — This pretty species is an excellent border plant, and likes a light rich sandy loam. It is best raised annually by means of seeds or cuttings.

P. lævigatus.—A vigorous species 2–4 ft. high, with somewhat glossy ovate or oblong lance-shaped leaves lobed and clasping at the base. Flowers in summer about 1 in. long, white, tinged with purple, abruptly bell-shaped and inflated above, the sterile stamen being slightly bearded at the apex.

Culture &c. as above. Increased by seeds, cuttings, or divisions.

P. Lobbi (*Lepidostemon pentstemonoides*).—A distinct and bushy Californian species 12–18 in. high, readily recognised by its small oval or elliptic lance-shaped, Box-like leaves. Flowers from July to September, bright orange-yellow, bell-shaped, the upper helmet-shaped lip being washed with red and hairy outside; filaments yellow with bluish anthers.

Culture &c. as above. Requires to be treated like *P. jaffrayanus.*

P. Menziesi Douglasi.—This plant is probably better known as *P. crassifolius.* It grows about 1 ft. high, and has rather small entire obovate lance-shaped thick leathery leaves. Flowers in June and July, lilac-purple, tinged with pinkish-red at the base, with an inflated throat. The variety *Scouleri* is a much taller-growing plant about 3 ft. high, with obovate lance-shaped sharply toothed leaves, and purple flowers which are produced in great abundance in May and June. The true *P. Menziesi* is recorded as having flowered in the Edinburgh Botanic Garden in 1888, but seems to be identical with the variety *Douglasi.*

Culture &c. as above.

P. murrayanus.—A highly ornamental species 2–3 ft. high or more, having oval lance-shaped, long-stalked glaucous or greyish leaves at the base of the stems, the upper ones being roundish and united at the base. Flowers in July and August, bright scarlet, about 1½ in. long, the sterile stamen being unbearded. There are several varieties, which differ only in the colour of the flowers, the principal shades being rose, lilac, scarlet, crimson, and violet. The strain called *grandiflorus* has larger and more numerous flowers than the ordinary form.

Culture &c. as above. They are all best raised from seeds sown in autumn every year, the young plants being wintered in cold frames. Or by cuttings inserted at the same season in cold frames.

P. ovatus.—A graceful and somewhat downy species 3–5 ft. high, with more or less ovate-lance-shaped leaves, often sharply toothed, and of a bright shining green, the upper ones rather heart-shaped at the base and stem-clasping. Flowers from June to September, small, in dense clusters varying from deep blue to rosy-purple, and having a bearded sterile stamen.

Culture &c. as above. It is best raised annually in the autumn like *P. murrayanus,* as it usually flowers well the following year.

P. Palmeri.—A vigorous and somewhat glaucous species about 18 in. high or more, having narrow lance-shaped sharply toothed leaves, the lower ones narrowed into stalks, the upper ones half stem-clasping. Flowers in summer, pale purple, somewhat broadly bell-shaped about the calyx and borne in loose twiggy raceme-like panicles.

Culture &c. as above. Requires the same treatment as *P. murrayanus,* although a hardier plant.

P. pubescens (*P. hirsutus; P. mackayanus; Chelone Pentstemon*).—A plant about 1–3 ft. high, covered more or less with a somewhat clammy down, and bearing linear or ovate lance-shaped leaves, the upper ones being reduced to small bracts. Flowers from June to August, bluish-violet, or partly whitish, in loose clusters; sterile stamen long and densely bearded.

Culture &c. as above. This species likes fairly good and rich soil, and may be increased by seeds sown in autumn, or by division of the clumps in early spring. Cuttings may also be rooted in autumn in cold frames.

P. puniceus.—A glaucous species about 3 ft. high, native of Mexico. Leaves in rosettes of a bluish-green, oval acute, thickish. Flowers in summer, brilliant red or scarlet, somewhat downy outside, and arranged in long clusters.

Culture and Propagation. — This is best raised from autumn-sown seeds in cold frames annually and planted out the following May in warm sunny spots in fairly rich soil.

P. Rattani. — A vigorous Californian species 12–18 in. high, resembling *P. Digitalis* in appearance. It has broadly ovate tapering leaves, the lower ones being stalked, the upper ones sessile, stem-clasping, and sparingly toothed. The lilac-purple flowers, each about an inch long, are borne in panicles at the end of the shoots.

Culture &c. as above.

P. rotundifolius.—A very distinct and graceful Mexican species, closely related to *P. centranthifolius,* and recognised by its roundish acute leaves about 3 in. long, the lower ones stalked, the upper connate, and all distinctly glaucous. Flowers during the summer and autumn months, brick-red, about 1 in. long, tubular, downy outside, yellowish within, and borne in loose clusters on stems about 2 ft. high.

Culture &c. as above. Increased chiefly by seeds.

P. speciosus.—An elegant Californian species 3-4 ft. high with oval or spoon-shaped, stalked, somewhat hollowed leaves of a deep shining green above, the upper ones more or less stem-clasping. Flowers from May to July, sky-blue tinted with red, more or less bell-shaped, in spikes about 1 ft. long.

Culture &c. as above. This species is best treated like *P. jaffrayanus.*

P. spectabilis.—A handsome species about 2 ft. high with thick, leathery, lance-shaped, shining green leaves, the upper ones stem-clasping at the base. Flowers in summer, bluish-purple, 1 in. long, inflated above, in long loose panicles.

Culture &c. as above. Increased by seeds or cuttings.

P. venustus. — A pretty and rather downy plant about 2 ft. high, with more or less ovate lance-shaped leaves, the upper ones somewhat heart-shaped, stem-clasping, and closely serrated. Flowers in summer, about 1 in. long, purple, dilated upwards from a narrow tube, and borne in loose clustered panicles; sterile stamen densely bearded at the top.

Culture &c. as above. Increased by seed and cuttings in autumn.

P. Wrighti. — A handsome species about 2 ft. high with oblong lower leaves, and rather obovate or lance-shaped stem-clasping upper ones. Flowers in summer, rosy-red, about 1 in. long, inflated above, in loose panicles or cymes, sterile stamen long and densely bearded at the top.

Culture &c. as above. Increased by seed or cuttings.

GARDEN PENTSTEMONS

As stated before, these are the result of crossing and selecting from *P. Hartwegi* (*P. gentianoides*) and *P. Cobæa*, and possibly *P. murryanus.* They are all easily raised from seeds or cuttings as detailed above, and when grown in large beds or groups form a most attractive feature of the flower garden during the summer and autumn months. There are numerous named varieties grown by specialists, but as they are likely to be superseded by others with the issue of every new catalogue it is scarcely necessary to give a list of them here. The predominating colours are red, purple, magenta, rose, carmine, scarlet, salmon, all usually combined with white, and having numerous intermediate shades. A very fine selection may be obtained from a packet of good mixed seeds.

COLLINSIA.—A genus containing about 12 species of pretty erect decumbent or loosely branched annual herbs with opposite, or rarely ternately whorled, entire or toothed leaves, or the lower ones deeply 3-cleft. Flowers gaily coloured in clustered cymes, blue, violet or rosy often mixed with white. Calyx bell-shaped deeply 5-cleft. Corolla-tube saccate at the base on the upper side, 2-lipped, the upper lip 2-lobed, bent backwards, the lower lip 3-lobed, the middle lobe longer pouch-like enclosing the four didynamous stamens. Capsule ovoid or globose, many-seeded.

Culture and Propagation. — These showy annuals are easily grown in ordinary garden soil and are most effective in large masses, and in edgings. They are usually raised from seeds sown in gentle heat in early spring or in the open border about April, and flower in about 3 months from the date of sowing. They are often grown in pots for the ornamentation of windows, balconies &c. Sowings may be made at intervals to secure a succession of blossom. In favourable situations the seeds if sown in autumn are likely to survive an ordinary winter, and plants thus raised will flower somewhat earlier than those from spring-sown seeds. The species are all natives of the W. United States, chiefly California. For the culture and treatment of annuals in general see p. 78.

C. bicolor. — A pretty Californian annual, about 1 ft. high, with erect, downy stems, and smooth, ovate lance-shaped leaves, rather heart-shaped at the base. Flowers in August, large, upper lip and tube of corolla white, lower lip rosy-purple. There are several forms, among them being *alba*, a vigorous grower, with white flowers having the upper lip slightly tinged with green or yellow; *candidissima* has absolutely pure white flowers; *alba rosea* has the upper lip white, and the lower one soft rose, a charming plant; *multicolor* is very pretty and free-flowering; flowers striped with lilac or rose-white, and violet colours which appear sometimes on the upper lip only, sometimes the lower, and sometimes on both; *marmorata* has a white lower lip washed with lilac, and an upper lip of a clear lilac spotted and striped with carmine.

A packet of mixed seeds will probably yield all these varieties.

Culture &c. as above.

C. grandiflora.—A pretty Columbian species, about 1 ft. high, having the lower leaves spoon-shaped, and the upper ones oblong linear. Flowers from May to July, pale purple, the upper lip being blue, the tube being washed with rose. There is a white-flowered form not particularly attractive. Notwithstanding its name, the flowers of *C. grandiflora* are sensibly smaller than those of *C. bicolor* and its varieties. It may be used in the same way and is somewhat hardier, so that it may be sown in autumn, and left unprotected in winter in most parts of the country.

Culture &c. as above.

C. verna.—A distinct species, about 1 ft. high, with slightly branched erect stems and lance-shaped leaves. Flowers in spring, white, lower lip of a beautiful clear blue.

Culture and Propagation. — This species is particularly valuable on account of its early-flowering propensities. It does not succeed well from spring-sown seeds. To obtain good flowering plants, seeds are best sown about September and October in light, well-drained soil, covering them only very slightly, and thinning them out if they come up too thickly. In severe winters they may require the protection of old lights, but scarcely otherwise.

There are a few other species, such as *corymbosa*, with white and pale blue flowers; *parviflora*, purplish-blue; *sparsiflora*, violet; *tinctoria*, pale pink; and *violacea*, bright violet, all of which may be treated like *bicolor* and *grandiflora*.

ZALUZIANSKIA. — A genus, perhaps better known as *Nycterinia*, containing about 16 species of more or less clammy herbs or undershrubs, often becoming black when dry. Lowest leaves opposite, the upper ones alternate often few-toothed, the uppermost ones smaller, bract-like, entire, appressed or adnate to the calyx. Flowers sessile in dense or interrupted terminal spikes. Calyx ovate-tubular, shortly 5-toothed, 2-lipped or parted. Corolla persistent, with an elongated tube at length cleft to the base, the throat often hairy inside; lobes 5, spreading, entire or 2-cleft. Stamens often 4, the 2 upper ones enclosed by the corolla tube. Capsule oblong, leathery or membranous, many-seeded.

Culture and Propagation. — These pretty plants are grown as tender annuals, and flourish in a mixture of sandy loam and peat. Seeds are raised in heat in early spring, the seedlings being planted out at the end of May, at a distance of about 1 ft. apart. Seeds may also be sown in September in cold frames or in pots in light soil. The plants must be protected in the greenhouse or cold frame during the winter months, during which period it is essential to keep the atmosphere as dry as possible, and also well ventilated on all favourable occasions. By the middle or end of May plants grown in this way will be strong and sturdy, and fit for the flower border. Grown in pots for the conservatory they often flower as early as April, especially in the case of *Z. capensis*. All the species are natives of S. Africa.

Z. capensis.—A beautiful annual, 6–12 in. high, with hairy stems, and linear, few-toothed or quite entire leaves, the edges and main nerve being usually ciliated. Flowers in spring, whitish, nearly 1¼ in. long, in short and few-flowered spikes, the middle one usually growing much longer than the others.

Culture &c. as above.

Z. lychnidea (*Erinus lychnidea; Nycterinia lychnidea*). — A tender shrubby perennial, 6–12 in. high, with hairy branches, and oblong linear few-toothed or entire leaves, 1-nerved and nearly smooth; the uppermost ones (bracts) stem-clasping, broadly lance-shaped or oblong, with edges and nerve ciliated. Flowers from May to July, yellowish-white, about 1½ in. long, in elongated spikes.

Culture and Propagation. — This species differs from the others in being a perennial. It may be increased by cuttings inserted in light sandy soil in cold frames in September, or by seeds sown in heat in spring and transplanted in May.

Z. selaginoides (*Erinus selaginoides*). — A pretty half-hardy annual 6–9 in. high, forming dense compact tufts of slender stems. Leaves spoon-shaped, the lower ones long-stalked, the uppermost ones attached to the calyx, and dilated at the base. Flowers in May and June, white with an orange centre, fragrant at night, the throat covered with stiffish hairs. Corolla lobes broadly obovate, deeply and bluntly notched at the apex.

This species is very free-flowering, and its masses of white flowers look charming with the carpet of green formed by the foliage. It is useful for borders or edgings or small masses by itself.

Culture &c. as above.

CHÆNOSTOMA. — A genus of about 26 species of smooth or downy, sometimes rather clammy herbs or undershrubs, with leaves nearly all opposite, toothed or rarely quite entire, the uppermost ones near the flowers more or less bract-like and free from the calyx. Flowers axillary or in terminal racemes. Calyx 5-parted with linear or lance-shaped segments. Corolla deciduous, with 5 entire, nearly equal spreading lobes. Stamens 4, didynamous, attached to the corolla tube, and more or less protruding.

Culture and Propagation. — These plants grow readily in ordinary garden soil, but are too tender for British winters. They may be raised from seed sown in February or March in a hotbed, and very sparsely covered with soil. The seedlings are pricked out into shallow boxes or pans, and by the end of May are fit to be transferred to the open border, 6–9 in. apart. Seeds may also be sown in August and September, but the young plants will require greenhouse protection during the winter. Cuttings may also be made during August and September, the plants thus obtained being grown under glass during the winter, either for conservatory decoration, in pots, or for the border. All the species are natives of S. Africa.

C. cordata. — A somewhat trailing, hairy species about 1½ ft. high, with ovate-rounded, stalked and toothed leaves, and masses of white axillary flowers in June.

Culture &c. as above.

C. fastigiata (*Manulea fastigiata*).— A pretty dense compact-growing species 6–9 in. high, with oval lance-shaped toothed leaves, and small rosy or reddish flowers on spikes 6–9 in. long. The variety *alba* has white flowers.

Culture &c. as above.

C. hispida.—A pretty species 3–6 in. or more high, with hairy and somewhat shrubby branches, having sessile, obovate elliptic-toothed leaves ¼–½ in. long. Flowers in July and August, solitary, in the axils of the leaves, soft pale lilac, or nearly white, the upper ones in loose racemes.

Culture &c. as above.

C. linifolia.—A shrubby species about 1 ft. high, having oblong lance-shaped or linear, quite entire leaves and white and yellow flowers in loose racemes late in autumn.

Culture &c. as above.

C. polyantha (*Manulea multiflora*).— A dwarf, much-branched species about 4 in. high, with ovate toothed leaves wedge-shaped at the base, the upper ones being oblong in shape. Flowers in summer, lilac and yellow, funnel-shaped, in loose racemes.

Culture &c. as above.

MIMULUS (Monkey Flower).—A genus containing about 40 species of decumbent or erect, smooth or hairy, sometimes clammy herbs, rarely tall growing or shrubby. Leaves opposite, undivided, entire or toothed. Flowers axillary, solitary, the upper ones sometimes in racemes at the ends of the branches. Calyx tubular, rarely bell-shaped, 5- angled or toothed, rarely 5-cleft. Corolla showy or rather small, yellow, orange, red, violet, or rosy, with a cylindrical tube; limb 2-lipped, upper one erect or reflexed 2-lobed; lower one 3-lobed, saccate or concave at the base. Stamens 4, didynamous. The genus *Diplacus* is now included under Mimulus and is chiefly distinguished by its shrubby stems.

Culture and Propagation.—Most of the Monkey Flowers flourish in rather damp soil and partially shaded situations, and are very ornamental in the flower border or near the margins of lakes, ponds &c. They are increased by seeds, which being exceedingly fine must be sown with great care and evenness on a finely prepared surface in gentle heat in spring. They should not be covered. As soon as the seedlings are large enough to handle easily they may be pricked out singly into small pots and grown under glass, with a shift into larger pots before they are ready for planting out at the end of May. Or they may be grown entirely in pots for conservatory decoration. Seeds may also be sown at the end of

August or beginning of September in light fine soil and treated in a similar manner; but this means occupying space under glass during the winter months. Many kinds sow themselves and give a crop of seedlings every year when grown in cold frames or greenhouses. The creeping underground stems being perennial may also be divided in early spring, and if placed in gentle heat and kept moist will soon make fine plants. Cuttings may also be inserted in early spring in a fine light soil and a warm moist atmosphere. The following are a few of the best garden species:—

M. cardinalis (*Diplacus cardinalis*). A pretty species 1–3 ft. high, native of the W. United States. Leaves stem-clasping ovate with coarsely toothed margins. Flowers from June to August, large, red, axillary, with a tube about 1½ in. long. The stigma has 2 irritable lobes which close together at the slightest touch. There are several varieties of this species, among which may be mentioned *atrosanguineus*, deep blood-red; *aurantiacus*, orange-red; *Hudsoni*, clear crimson-red, with a yellow blotch in the throat striped with purple.

Culture &c. as above. Increased by seeds, cuttings, or division.

M. cupreus.—A beautiful dwarf species 8–12 in. high, native of the Chilian Andes. Leaves opposite, usually tinted with brownish-red; the lower ones oval lance-shaped, toothed; the upper ones sessile. Flowers in summer in the axils of the upper leaves, almost regular, copper-coloured, purple-brown, or crimson, the velvet throat being yellow and spotted with crimson-purple.

This species has been considerably altered by cultivation and has developed innumerable forms. This result seems to have been achieved principally by crossing with *M. variegatus*, thus forming a chain of forms between *M. luteus* proper and *M. cupreus*. These hybrids are known to gardeners under a variety of names such as *tigrinus*, *pardinus*, *tigridioides*, *quinquevulnerus*, *rubinus*, *speciosus*, and *maculosus*, all meaning pretty much the same thing. Besides the numerous single-flowered variations there is also a double-flowered or 'hose-in-hose' variety, in which the calyx assumes a similar appearance to the corolla. When the proper corolla withers, the metamorphosed calyx retains its freshness and colour for some days longer, and in this way the 'hose-in-hose' varieties bloom for a longer period than the single-flowered ones. There is a new form called *Burneti* obtained by crossing *M. cupreus* with *M. luteus*. It comes near the latter and seems to be almost hardy.

Culture and Propagation.—All these hybrid Monkey Flowers flourish in a light rich soil containing plenty of leaf-soil and a fair quantity of sand, and are quite as happy in sunshine as in shadow, provided the latter is not too dense. Sometimes violent winds play havoc with the flowers, and if possible they should be sheltered on such occasions if in exposed situations.

They are all increased by seeds, cuttings or division, and require the protection of a greenhouse or cold frame in winter.

M. Lewisi (*M. roseus*).—A rare and pretty Californian species about 1 ft. high with stem-clasping oblong or rarely ovate acute leaves, somewhat toothed and many-nerved. Flowers late in summer, rosy, with spreading corolla lobes.

Culture &c. as above. Increased by seeds and division in early spring.

M. luteus (*M. guttatus; M. punctatus*). *Common Monkey Flower.* — A bright green softly downy Californian species, with slightly knotted branching stems 9–12 in. high. Leaves opposite, ovate, or oblong coarsely toothed. Flowers in summer, yellow, about 1½ in. long, and having 2 dark crimson and purple marks in the throat of the corolla. The variety *Neuberti* is a strain with double flowers; and *nobilis* is a dwarf form remarkable for having 'hose-in-hose' flowers, that is one corolla inserted in the other like some of the Polyanthuses.

Under this species may be placed the plant known as *M. variegatus*, a native of Chili with large open flowers, having a white or yellow ground irregularly blotched with rich crimson, maroon, or purple. The leaves are also more or less constantly marked with brown. *M. luteus* and *M. variegatus* are best treated as annuals.

Culture &c. as above.

M. moschatus (*Musk*).—A well-known North American hardy perennial with tufts of trailing woolly stems having stalked ovate lance-shaped slightly toothed softly woolly leaves, rounded at the base and somewhat clammy. Flowers during the summer and autumn months, yellow, and nearly regular in outline, the lower lip being striped with orange. The variety *Harrisoni* is a stronger growing large-flowered variety extensively cultivated both for the flower border and in pots.

Culture and Propagation.—This species is a great favourite owing to its agreeable musky scent which pervades the surrounding atmosphere. It is suitable for borders in somewhat shady places, and also for the rock garden, flourishing in damp rich soil with plenty of humus in it. It is very often seen grown in pots hanging in cottagers' windows. The leaves perish in winter, but the white creeping underground stems send up masses of green leaves every spring.

Seeds may be sown early in spring in heat, or in the open in April and May, or the creeping stems may be divided in early spring. With a little protection of leaves &c. it is hardy in exposed places in winter. The variety *Harrisoni* may be increased by seeds or cuttings.

MAZUS.—A genus with 4 species of dwarf hairy or smoothish often twiggy herbs. Lower leaves opposite, upper ones usually alternate, incised-crenate or coarsely toothed. Racemes terminal, rather one-sided. Calyx broadly bell-shaped, half 5-cleft. Corolla tube short or scarcely longer than the calyx, 2-lipped, the upper lip ovate erect, shortly 2-cleft; the lower one much larger, spreading, 3-cleft, saccate at the base. Stamens 4, didynamous. Capsule globose or compressed, with numerous minute seeds.

M. Pumilio.—A distinct and vigorous species native of New Zealand and Australia, with creeping underground stems, from which spring dense tufts about 1 in. or so high, clothed with spoon-shaped leaves, having slightly wavy margins, and 1–2 in. long. Flowers in summer, pale violet, with white centres, 1–6 on slender stems, scarcely rising above the foliage.

Culture and Propagation.—This is the only species grown. It thrives in free sandy soil in warm sheltered parts of the rock garden. It is easily increased by dividing the tufts early in spring or autumn. When divided in autumn, it is safer to plant the tufts in cold frames in light rich soil until the following May. Seeds may also be sown in pots or pans in greenhouses or cold frames in March and April in finely prepared soil. They are very minute and require no covering. They must, however, be kept moist and shaded. When large enough the seedlings may be pricked out and grown on in cold frames until the following spring, when they will be sturdy enough for planting out.

SIBTHORPIA (MONEYWORT).—A genus containing 6 species of trailing, hairy herbs, the stems often rooting at the joints. Leaves alternate or clustered, stalked, roundish kidney-shaped and coarsely crenate or incised and pinnately cut. Flowers yellow, yellowish-rose, or red, on axillary, solitary, or clustered and bractless pedicels. Calyx bell-shaped, 4–8-(often 5-) cleft. Corolla tube short, or very slightly rotate; lobes equal in number to those of the calyx, or one more, spreading. Stamens equal in number to the corolla lobes, or one less. Capsule membranous not many-seeded.

S. europæa.—A rare and pretty British trailer, with slender thread-like stems 6–12 in. long, and membranous leaves ¼–¾ in. across, with 7–9 broad, rounded, or retuse lobes. Flowers from July to October, pink, 5-lobed, the 2 smaller lobes yellowish. Calyx lobes 5; stamens 4. The variety *variegata* is a charming little trailer with silvery white and green leaves.

Culture and Propagation.—The common green-leaved plant flourishes near ditches and on moist shady banks, and is readily increased by dividing the rooted stems. It is best grown in swampy parts of the rockery. The variegated form is a lovely little plant, unfortunately difficult, on account of its delicate nature, to grow out of doors even under the most suitable conditions. It is often seen to perfection in cool greenhouses or cold frames, where it may flourish for several seasons, and then almost suddenly die away except for a particle or two.

S. peregrina is a small trailing greenhouse perennial with yellow flowers. Native of Mauritius.

Culture &c. as above.

REHMANNIA.—A genus with only 2 species of hairy, clammy, perennial herbs, having alternate, obovate, or oblong coarsely toothed leaves. Calyx ovoid-bell-shaped, 5-cleft at the apex. Corolla slightly incurved with a rather broad inflated tube; limb oblique, 2-lipped, spreading; upper lip deeply 2-cleft; lower lip 3-cleft. Stamens 4, didynamous. Capsule broad, somewhat enclosed by the calyx.

R. chinensis (*R. glutinosa*).—A handsome Chinese perennial 1–2 ft. high, often with purplish stems. Lower leaves mostly alternate, shortly stalked, 1–3 in. long, becoming smaller upwards. Flowers in April, about 1 in. long, wholly or partially of a dull purple colour, with darker stripes.

Culture and Propagation.—This is the only species grown. It thrives in moist peaty soil, in a warm sheltered border having a west aspect. It is best protected in cold frames in winter, except perhaps in the mildest parts of the southern coast. It is increased by imported seeds or by cuttings inserted in sandy soil in spring under handlights.

DIGITALIS (Foxglove; Fairy Thimble).—This genus contains about 18 species of smooth, hairy, or woolly biennial or perennial herbs, with alternate leaves, the lower ones often clustered and elongated, quite entire or toothed. Flowers in long terminal and often one-sided racemes, purple, yellowish-white, or white, often showy, the corolla sometimes spotted within and bearded in the throat. Calyx 5-parted. Corolla bent down, with an inflated or bell-shaped tube, often contracted above the ovary; limb obliquely 4-lobed, the upper lip being much shorter than the lower one. Stamens 4, didynamous. Capsule ovate, many-seeded.

Culture and Propagation.—The Foxgloves or Fairy Thimbles are not only among the best and most handsome of hardy herbaceous plants, but they are also very easily grown. Indeed the common British species *D. purpurea* cannot be said to require any cultivation at all, as it seeds and increases freely in any ordinary garden soil without requiring any attention whatever. The other species may be grown like it, and only the choice varieties require a little care. Seeds may be sown as soon as ripe, in autumn, in the open border or wherever the plants are required to bloom the following year. Seeds sown in spring will not produce flowering plants until the following year. The seedlings may either be pricked out to about 6–9 in. apart or thinned out if in great numbers. An easy way to increase the stock is by dividing the tufts in autumn when the leaves and flowers have withered.

D. ambigua (*D. grandiflora; D. ochroleuca*).—A pretty hairy European perennial 2–3 ft. high, with ovate lance-shaped, toothed, and sessile leaves, downy beneath. Flowers in July and August, yellowish or sulphur-coloured, veined with brown, 2 in. long, in spikes 12–18 in. long. The variety *fuscescens* has brown flowers smaller than in the type.

Culture &c. as above.

D. purpurea.—This is the Common Foxglove or Fairy Thimble found wild and luxuriant in all parts of the British Islands. It grows 2–5 ft. high, with large ovate oblong or lance-shaped, crenate, wrinkled leaves, 6–12 in. long. Flowers from July to September, drooping, 1½–2½ in. long, purple, spotted with eye-like, deeper purple spots in the centre of a white ring, and borne in dense one-sided racemes 1–2 ft. long. Cultivation and constant raising from seeds have produced many charming varieties of the Common Foxglove, and there are now forms with flowers varying from the purest white to the deepest rose and purple, all vigorous and free-flowering. Of late years a strain has been developed in which the flowers have become almost regular like those of the cultivated *Gloxinia*, and the name *gloxinioides* or *gloxiniæflora* has been aptly applied to them. The flowers are more open and bell-shaped than those of the ordinary varieties, and are always spotted and ocellated with purple. Very often both kinds are produced on the same spike, the upper ones being erect and Gloxinia-like, the lower ones drooping as in the ordinary forms.

Culture &c. as above.

There is hardly a vacant spot in the garden that would not look all the better for a clump of beautiful Foxgloves in it, no matter how wild or rough it may be. Owing to their height Foxgloves should be placed in the back parts of borders and in shrubberies in front of those plants only which are naturally taller than them. Where there are bare walls or fences, Foxgloves make an excellent flower screen in front of which dwarfer plants may be grown. Once established in a garden, it is not a question of how to increase them, but rather how to prevent them from spreading too rapidly, and by their vigour crushing out less robust plants. When necessary they may be increased by seeds and division, as mentioned above.

There are a few other species of Foxglove in cultivation, but they do not possess the value or brilliancy of the common one. The best are *dubia*, purple; *ferruginea*, rusty brown; *laciniata*, yellow, with jagged leaves; *lævigata*, soft brown; *lanata*, white veined with pink; *lutea*, yellow; *mariana*, rosy; *obscura*, golden-yellow, shaded and veined with brown; and *Thapsi*, purple with a pale throat, spotted with blood-red.

ERINUS.—This genus contains only the following species:—

E. alpinus.—A pretty Pyrenean tufted perennial 5–6 in. high, with alternate, oblong spoon-shaped, crenate or toothed, hairy leaves. Flowers from March to June, violet-purple, in simple one-sided racemes at the ends of the branches. Calyx 5-parted, with oblong, linear segments. Corolla tube slender, with a spreading 5-lobed limb, divided into two lips. Stamens 4, didynamous. The variety *hirsutus* is more vigorous than the type, and covered with a hairy down. There is a variety with white flowers called *albus*.

Culture and Propagation.—A suitable plant for the rockery in stony or gritty loam and peat in positions where the water will readily pass away and where the full force of the summer sun will not scorch it. It does not stand the winter well on level ground, and is more at home on old walls or ruins in the chinks of which seeds may be sown. The plants may be increased by dividing the tufts early in autumn or spring, but seed is the more usual method. It is sown in well-drained sandy peat about April or May, and when the plants have become large enough to handle easily, they are pricked out into pots or pans and grown on until the next spring before planting out. Young plants thus raised should be sheltered in cold frames in winter.

OURISIA.—A genus containing about 18 species of low, decumbent, or slightly creeping, smooth, and scarcely hairy herbs. Leaves opposite, sometimes all alike or the radical ones stalked, the upper ones almost absent or reduced to bracts; sometimes, but more rarely the upper ones, alternate, quite entire or often crenate. Flowers often scarlet or pink. Calyx 5-cleft or parted. Corolla tube cylindrical or bell-shaped, often widened at the throat; lobes 5, spreading, blunt, or emarginate, nearly equal. Stamens 4, didynamous.

O. coccinea.—A handsome dwarf trailer 6–12 in. high, native of the Chilian Andes. Leaves mostly radical, oval, or oblong, unevenly but not deeply notched. Flowers from May to September, scarlet, drooping, about 1½ in. long, in panicled clusters. Stamens protruding.

Culture and Propagation. — This species requires to be grown in particularly well-drained soil. Moist sandy peat suits it best with a little sand or grit added. A hot, dry, and exposed position is generally fatal to it. A west or north aspect is best, so that the plant may have plenty of light but not too much glaring sun. A few rough stones may be placed about the plants, and in favourable positions they will soon be covered with the shoots of green leaves and brilliant flowers. It is an excellent little plant for the flower border, rockery, or bog garden.

SYNTHYRIS.—A genus of smooth or hairy thick rooted perennials with radical, stalked, ovate or oblong and crenate or deeply cut leaves. Flowers blue or reddish, in racemes or spikes. Calyx 4-cleft. Corolla roundish bell-shaped usually 4-lobed. Stamens 2.

S. reniformis.—A distinct N. American perennial 6–9 in. high, with leathery kidney heart-shaped leaves 1½–2½ in. across and doubly toothed on the margins. The pale violet-blue flowers, with oblong lance-shaped unequal corolla lobes, appear in April in loose erect trusses 4–6 in. long.

Culture and Propagation. — This plant thrives in ordinary good and well-drained garden soil and may be used in masses in the rock garden. It may be increased by seeds sown in cold frames when ripe, or in spring, and also by dividing the roots in spring.

WULFENIA.—A genus with 4 species of smooth or slightly hairy perennial herbs, having a thickened rootstock, and almost radical, stalked, crenate leaves. Flowers blue, without bracteoles in racemes or spikes at the top of the scapes. Calyx 5-parted. Corolla tube protruding, cylindrical; limb 4-lobed, erect, spreading, the upper lobe emarginate or 2-cleft. Stamens 2, attached to the sinus of the corolla-lobes, protruding.

W. amherstiana.—A rare Himalayan species with ovate oblong or spoon-shaped leaves 2–5 in. long, coarsely crenate or lobulate, narrowed at the base and somewhat pinnately cut. Flowers in July, about ⅓ in. long, blue, with lance-shaped acute lobes, borne in long slender racemes on scapes 5–10 in. high.

Culture and Propagation. — This species grows freely in light rich soil and prefers partially shaded positions in the rock garden with a north or west aspect. It may be increased by dividing the tufts carefully in spring, also by imported seeds sown in gentle heat at the same period, and grown on for about a year before planting out. In wet winters it is advisable to protect the plants with a sheet of glass, as they are apt to rot away with too much cold moisture.

W. carinthiaca.—An almost stemless evergreen, native of the Carinthian Alps, with more or less obovate-oblong, doubly crenate leaves, slightly lobed and narrowed at the base; radical ones few, 3–8 in. long. Flowers in summer, blue, drooping, about ¼ in. long, in dense spike-like racemes at the top of a scape 1–2 ft. long.

Culture &c. as above. Suitable for rockeries or borders in moist sandy soil, requiring similar treatment to *W. amherstiana.*

PÆDEROTA. — A genus with 2 species of low, somewhat downy or hairy perennial herbs, having opposite, serrate, or incised leaves, and blue or yellow flowers in dense terminal spikes. Calyx 5-parted. Corolla-tube cylindrical; limb somewhat 2-lipped with erect or spreading lobes, the upper one entire, the lower one 3-cleft. Stamens 2; protruding capsule reflexed.

Culture and Propagation.—Although perennial these plants are usually treated as annuals, and are raised from seed sown either in early spring in gentle heat and planted out in May, or in September, and wintered in cold frames. They flourish in the rock garden, in well-drained sandy soil or a compost of peat, lime, and sand, and do not like too much moisture, except in particularly hot summers. Both species are natives of the mountains of Central and E. Europe. A natural hybrid named *Churchilli* has been obtained by crossing the two species described below.

P. Ageria.—A somewhat downy species 12–18 in. high with leaves varying from ovate at the base to narrow, lance-shaped, toothed above, the intermediate ones being about 1½ in. long and 1 in. broad. Flowers in May and June, yellow, about ½ in. long, in short compact spikes.

Culture &c. as above.

P. Bonarota.—A hairy species 2–6 in. high, with lower rounded leaves, the upper ones ovate or lance-shaped, toothed or cut. Flowers in May and June, blue, about ⅓ in. long, in roundish or oblong spikes 1–3 in. long.

Culture &c. as above.

VERONICA (Speedwell; Cancerwort).—A genus containing about 160 species of herbs, shrubs, or rarely trees, with opposite and alternate or rarely whorled leaves. Flowers in terminal spikes or racemes, rarely solitary and axillary, blue, purple, flesh-coloured or white, but never yellow. Calyx 4–5- or very rarely 3-parted. Corolla rotate or shortly bell-shaped, with 4–5 unequal, spreading lobes. Stamens 2, protruding. Capsule flattened or turgid, containing few or many seeds.

Veronicas differ a great deal in habit and growth, and at a glance the amateur would find it hard to believe that some of the prostrate or trailing kinds, like the British *agrestis*, *Buxbaumi*, *hederæfolia* &c., belonged to the same genus as the well-known *Andersoni* and *Traversi.* Although there are many species, only comparatively few can be regarded as absolutely hardy in the British Islands, except in the mild southern parts. Many of the kinds, notably *Andersoni*, *pinguifolia*, *salicifolia*, and *Traversi*, will stand from 10° to 20° frost without injury in some parts of the country, but in others will suffer severely from only a few degrees, owing no doubt to local conditions. As many of the kinds described below seed freely in good seasons, and often sow themselves, it would be wise to encourage the growth of plants obtained in this natural way, as they are far more likely to stand our climate than plants raised from seeds and cuttings in heat or cold frames.

Culture and Propagation. – Veronicas flourish in ordinary good garden soil, and except in the southern parts are safer planted near warm walls and sheltered spots having a south or west aspect. The shrubby kinds may be increased by cuttings inserted in fine sandy soil in cold frames in late summer and autumn. They require protection in winter, and by

March or April will be sturdy enough for planting out.

The trailing and tufted kinds may be increased by dividing the roots in spring, or in the case of those trailing kinds that root at the joints of the branches, each portion with a cluster of roots will grow into a plant if severed and put into good sandy soil and kept a little shaded until established.

The following is a list of the best kinds for the garden, but there are many others to be found in botanical collections.

V. Andersoni.—A beautiful but somewhat tender shrub, of garden origin, about 1½ ft. high, with oblong thickish leaves 3–4 in. long, and racemes of bluish-violet or whitish flowers produced in summer and autumn. The variegated form is very handsome, but even more tender than the type. They should both be grown in warm sheltered spots. Usually grown as pot plants for conservatory decoration.

Culture &c. as above. Increased by cuttings in late summer and autumn. Specimens have been recorded as having stood 10°–20° of frost without injury.

V. angustifolia.—A very old but rarely seen New Zealand species about 18 in. high, with slender erect stems, and very narrow pointed leaves. Flowers from July to September, blue, in spiked racemes at the ends of the branches.

Culture &c. as above. This species occasionally 'sports' into variegated forms, and although these may be easily increased by cuttings, they revert in a year or two to the green state. It has stood a frost of 16° uninjured for about 6 weeks. At one time largely grown as a pot plant.

V. anomala.—A beautiful dense-growing New Zealand shrub 3–6 ft. high, with purplish or reddish branches, and decussate, linear oblong, leathery leaves, ½–1 in. long, often tinted with red. Flowers in summer, white, in crowded racemes.

Culture &c. as above. Increased by cuttings.

V. carnosula.—A distinct New Zealand shrub, often with a trailing habit, and having broadly ovate or oblong rounded, very thick leaves, and dense racemes of white flowers in summer.

Culture &c. as above. Increased by cuttings. It has stood 10° of frost without injury, when protected with snow.

V. chathamica.—A beautiful trailing and rambling New Zealand shrub, with slender, wiry, and downy branches, and oblong-elliptic acute leaves, ½–1 in. long. The deep purple or sometimes white flowers are borne in late summer in dense racemes at the ends of the branches and the axils of the upper leaves, and have a very showy appearance.

In ordinary winters this species is practically hardy, and there would be little difficulty in giving it some protection in very severe winters. Its trailing habit makes it a valuable plant for the decoration of the rockery.

Culture &c. as above.

V. cookiana.—A handsome New Zealand shrub, with almost sessile, slightly downy, opposite, elliptic leaves, about 3½ in. long. Flowers in autumn, small, white, in dense axillary pyramidal racemes 3–4 in. long, with much protruding style and stamens.

Culture &c. as above. Increased by cuttings in late summer and autumn.

V. cupressoides.—A pretty and very variable New Zealand shrub reaching a height of 3–4 ft. in a wild state, but rarely more than a foot or so high in cultivation. The leaves are very small and closely pressed to the slender branches which resemble the tips of some forms of *Cupressus* or *Retinospora.* Flowers violet, minute, 3–4 at the ends of the slender branches. This species is often called *V. salicornoides* in gardens, but the latter does not appear to be in cultivation. *V. lycopodioides* is a somewhat similar species with tiny white flowers.

Culture &c. as above. Increased by cuttings.

V. elliptica (*V. decussata*).—A small tree or shrub 5–20 ft. high, native of New Zealand and parts of South America, from Chili southwards. Leaves close-set, linear or obovate oblong, ½–¾ in. long. Flowers in summer, white, ⅓–⅔ in. across, in short, few-flowered racemes.

Culture &c. as above. This species has passed uninjured through 10° of frost. It may be increased by cuttings.

V. Fairfieldi.—A pretty little Veronica supposed to be of garden origin, and not a true native of New Zealand. It is bushy in habit, and 6–9 in. high, the branches being furnished with small thick glossy green leaves. The blue flowers are borne in great profusion from May to July and August in the axils of the upper leaves.

Culture &c. as above. This is an excellent rock plant and may be grown in warm sunny nooks and corners, or in the chinks of rocks where its roots can obtain plenty of moisture. It may be increased by cuttings in late summer and autumn in cold frames.

V. gentianoides.—A pretty Caucasian perennial, with tufted stems 6–12 in. or more high. Leaves 1–3 in. long, thickish, crowded below, obovate or oblong, entire or slightly crenate. Flowers in May and June, greyish-blue, rather large, slightly bearded in the throat, in erect spikes. There is a white-flowered variety, *alba*, and one with variegated leaves—both worth growing.

Culture &c. as above. Increased by division.

V. glauco-cærulea.—A dwarf decumbent or somewhat erect, much-branched New Zealand shrub, distinguished by its densely glaucous appearance, and slightly hairy branches. Leaves closely imbricated, ⅓ in. long, obovate-oblong acute, rather concave. Flowers deep blue, changing to purple, in short few-flowered racemes.

Culture &c. as above. Increased by cuttings.

V. Haasti.—A handsome New Zealand shrub 1–3 ft. high, with smooth shining green oblong elliptic leaves about 1 in. long, and with a dark ring round the stem at each joint. The small pure white flowers appear in June at the tops of the shoots, and are rendered conspicuous by the red anthers on the white stamens.

Culture &c. as above. Increased by cuttings in late summer and autumn in cold frames.

V. Hectori.—This is a very ornamental shrubby species 1½–3 ft. high. It has roundish branches to which the triangular scale-like leaves are closely appressed.

Culture &c. as above. Increased by cuttings in late summer or autumn. This species seems to be quite hardy in the Thames Valley.

V. Hulkeana.—A pretty New Zealand shrub, 1–3 ft. high. Leaves in distant pairs, 1–1½ in. long, oblong ovate, coarsely toothed, and rather leathery in texture. Flowers in summer, lilac, ¼ in. across, in opposite-branched panicles, 4–10 in. long.

Culture &c. as above. Increased by cuttings.

V. incana (*V. candida; V. canescens; V. neglecta*).—A Russian perennial, about 2 ft. high, with oblong or lance-shaped silvery leaves about 2 in. long, and racemes of dark blue or purplish flowers in summer.

Culture &c. as above. This is a free grower, and is easily increased, either by division in spring, or cuttings in autumn.

V. longifolia.—A native of Central Europe, 2–4 ft. high, with opposite or ternately whorled leaves, ovate or oblong-lance-shaped, taper-pointed, and sharply serrate. Flowers in August, lilac, white, rose or purple, in dense racemes. This is often confused with *V. spicata*. There is a form having the leaves more or less constantly but irregularly variegated.

The variety *subsessilis* is a native of Japan, 2–4 ft. high, and is distinguished from the type by its shortly stalked and simply serrated leaves 2–4 in. long, and its large dense spikes of deep purple-blue flowers.

Culture &c. as above. This is a fine garden plant, and flourishes in deep rich loamy soil. Increased by division, cuttings, or seeds.

V. Lyalli.—A beautiful New Zealand shrub with slender trailing stems 5–15 in. long, rooting at the joints. Leaves ¼–½ in. long, ovate to ovate lance-shaped with a few coarse teeth. Flowers in summer, white, veined with pink in the throat, nearly ½ in. across, and borne on slender axillary stalks 3–8 in. long.

Culture &c. as above. Increased by separated portions of the rooted stems.

V. orientalis (*V. taurica*).—A dwarf wiry species native of the Levant, forming dark green tufts about 3 in. high. Leaves linear lance-shaped entire or toothed. Flowers in July, gentian-blue, freely produced in axillary racemes.

Culture &c. as above. Useful for the rock garden drooping from fissures, or at the base rambling over stones. It flourishes in light well-drained loam and may be increased by division or seeds.

V. paniculata (*V. amethystina*).—A native of S.E. Europe, 1–3 ft. high, with somewhat spreading smooth or hoary pubescent stems and lance-shaped acute crenate serrate leaves opposite or 3 in a whorl. Flowers in summer, blue, in loose many-flowered racemes.

Culture &c. as above. When the growths become straggling, they may be removed in autumn, and new ones will take their place in spring. Increased by division or seeds.

V. **pectinata.**—A pretty Syrian species with downy or hairy trailing stems and spoon-shaped or oblong linear slightly crenate or incised leaves narrowed at the base. Flowers in May, blue, in racemes 9–12 in. long. There is a variety with rosy flowers.

Culture &c. as above. Suitable for the rockery or border. Increased by division.

V. **pinguifolia.** — A strong-growing erect or decumbent New Zealand shrub 4–6 ft. high in a wild state with transversely scarred branches. Leaves ¼–½ in. long, bluntly obovate-oblong entire, very thick and leathery, concave, but not keeled beneath. Flowers in June, white, crowded in heads at the ends of the branches.

Culture &c. as above. This species is often confused with *V. carnosula*. It has stood 10° of frost without injury under a covering of snow. Increased by cuttings.

V. **repens.**—A pretty trailing Corsican species with bright- green leaves and masses of pale bluish flowers in May and June.

Culture &c. as above. A useful plant for moist corners of the rockery. Increased by division.

V. **salicifolia.**—A New Zealand shrub with round branches and sessile linear or oblong lance-shaped tapering entire and smooth Willow-like leaves 2–6 in. long. Flowers in June, bluish-purple and white, very variable in size and length of corolla tube.

Culture &c. as above. This species is recorded as having stood without injury 16° of frost. It may be increased by cuttings.

V. **satureioides.**—A rather rare Dalmatian species with tufted stems about 3 in. high, woody at the base. Leaves opposite and decussate crowded, oblong or obovate slightly toothed at the tip. Flowers in May, bright blue, in spiked racemes about ½ in. long.

Culture &c. as above. Increased by seed and division.

V. **saxatilis** (*Rock Speedwell*). — A pretty Scottish species forming tufts 6–8 in. high, and having leaves ¼–½ in. long, obovate below, oblong leathery above, with few or no teeth. Flowers from July to September, beautiful bright blue, ½ in. across, in few-flowered sub-corymbose racemes.

Culture &c. as above. A beautiful plant for the rockery. Increased by division.

V. **spicata.**—A desirable native species with stoutish stems 6–18 in. high. Leaves 1–1½ in. long, opposite or whorled, nearly stalkless, narrowly oblong lance-shaped, toothed towards the apex. Flowers in July and August, bright blue, with very long purple stamens, in dense spikes 1½–3 in. long.

Culture &c. as above. An excellent rock plant. Increased by division or seeds. There are several forms more or less confused in cultivation. The one called *hybrida* is a stronger grower with flowers varying from dark purple to lavender and pale rose. See *V. longifolia* above.

V. **Teucrium** (*Hungarian* or *Saw-leaved Speedwell*).—A variable species with prostrate or decumbent downy or hairy stems 8–12 in. high. Leaves ovate or linear in shape, rounded or heart-shaped at the base, and more or less toothed. Flowers in early summer, deep or pale blue, in many-flowered racemes. The variety *prostrata* is a distinct plant with small leaves and bright blue flowers; *latifolia* is a taller growing form with larger and broader leaves than the type.

Culture &c. as above. They are all increased by division and seeds.

V. **Traversi.** — An ornamental New Zealand shrub about 2½ ft. high, with sessile obovate or linear oblong entire leathery leaves ¾–1 in. long. Flowers in summer, white, about ¼ in. across, in many-flowered downy racemes.

Culture &c. as above. Increased by cuttings in late summer and autumn in cold frames.

V. **virginica** (*Leptandra virginica*).—*Culver's Physic; Great Virginian Speedwell.*—A N. American species 2–6 ft. high with lance-shaped tapering sometimes sharply serrate leaves 3–5 in. long, and arranged in whorls of three to nine. Flowers in July, white, sometimes bluish, salver-shaped, in spikes 6–10 in. long, usually with several shorter ones from the axils.

Culture &c. as above. This likes a rather rich light soil and may be increased by division or seeds.

LXXXII. LENTIBULARIEÆ—Butterwort Order

A small order of aquatic and marsh-loving herbs, with radical or whorled leaves in rosettes, entire or deeply cut, often bladder-like. Scapes erect, 1-flowered, or spicate or racemose. Flowers hermaphrodite, irregular. Calyx inferior, 2–5-parted, persistent, 2-lipped or regularly 5-toothed. Corolla gamopetalous, 2-lipped. Stamens 2, attached to the base of the corolla, or hypogynous. Ovary superior. Capsule 1-celled with numerous minute seeds.

To this order belong the Bladderworts (Utricularia), some of which are remarkable for their floating leaves furnished with small pitchers and trap-doors, which serve the purpose of ensnaring animalculæ.

PINGUICULA (BUTTERWORT).—An interesting genus containing about 30 species of terrestrial marsh-loving herbs, with radical leaves in rosettes, entire, often greasy to the touch, and having the peculiarity of imprisoning small insects by means of the edges curling over when irritated. Scapes erect, 1-flowered, without leaves or bracts. Calyx 4–5-parted or 2-lipped, the upper lip 3-parted, the lower one 2-cleft or parted. Corolla purple, violet, or yellow, 2-lipped, with spreading entire or slightly notched lobes, the 2 upper ones equal or much shorter than the other.

Culture and Propagation. — The hardy species described below all like marshy or boggy places, and are suitable for such situations in the rock garden. When they flourish they look very pretty and interesting, especially when several are grown together. They may be increased by seeds sown in peaty soil in pots steeped half way up in water; by dividing the crowns carefully in spring; or by putting detached leaves into sandy and moist peaty soil under bell-glasses.

P. alpina (*Scottish Butterwort*).—A pretty little Scottish species about 3 in. high, with elliptic oblong leaves about ⅔ in. long, somewhat hairy on the upper surface. Flowers in May and June, about ½ in. across, white, with a hairy yellow throat, and a very short conical spur.

Culture &c. as above. Flourishes in a peaty gritty soil in boggy parts of the rockery facing north.

P. grandiflora (*Irish Butterwort*).—A fine plant found wild in the bogs of Cork and Kerry, with rosettes of pale green fleshy, bluntly oval or oblong leaves 1–3 in. long. Flowers from May to July, 1 in. long and across, violet-blue, with a straight or curved spur, and borne on scapes 3–6 in. high.

Culture &c. as above. This species is perhaps the best of all Butterworts. It flourishes in moist half-shady spots in the rockery or bog garden in rich fat loam that will not hold stagnant moisture. The variety *longifolia* from the Pyrenees is very ornamental with leaves 4–5 in. long, yellow-green and clammy. It seeds freely.

P. hirtiflora.—A native of the mountains of Italy and Greece. It closely resembles *P. vulgaris*, but has paler violet flowers with a yellowish throat, and hairy scapes and calyx.

Culture &c. as above. It likes a rather warm sunny position in the rockery in moist peaty soil.

P. lusitanica.—A native of the British Islands and S.W. Europe, with oblong shortly stalked thin fleshy leaves ½–⅔ in. long. Flowers from June to October ⅓ in. long, lilac with a yellow throat, and a short conical incurved spur, on very slender scapes about 6 in. high.

Culture &c. as above. Peaty moist soil in sunny places.

P. lutea.—A N. American species about 3 in. high, with obovate-elliptic leaves about 1 in. long. Flowers in summer about 1 in. long, bell-shaped, yellow or golden, somewhat 5-lobed.

Culture &c. as above. Moist soil in sheltered sunny parts of the rockery.

P. vallisneriæfolia.—A native of the Spanish mountains, with clusters of pale yellowish-green, linear wavy leaves, sometimes almost transparent, and 4–6 in. long. Flowers in summer, soft lilac or purple, with distinctly whiter or paler centres.

Culture &c. as above. Very damp places in sheltered parts of the rockery, or on the edges of wet rocks, suit this plant.

P. vulgaris (*Bog Violet; Butter-root*). A pretty British and Irish species, with bluntly oblong fleshy leaves 1–3 in. long. Flowers from May to July, violet, ¾–1 in. long, with very unequal lips, and a slender spur. Scapes several, 4–6 in. high, purplish.

Culture &c. as above. This species flourishes in wet boggy places in sunny parts of the rockery.

LXXXIII. GESNERACEÆ—Gloxinia Order

A large order of herbs, shrubs, or rarely trees, very few of which are suitable for outdoor cultivation in the British Islands, although there are many beautiful representatives grown in greenhouses and hothouses, such as *Gloxinia, Achimenes, Nægelia, Gesnera, Streptocarpus* &c. Leaves usually opposite or whorled, wrinkled, and without stipules. Flowers hermaphrodite, irregular or rarely regular, showy, in racemes or panicles, rarely solitary, often scarlet, violet, or blue, sometimes yellow, rarely white. Calyx often gamosepalous, usually with 5 teeth or lobes. Corolla gamopetalous, tubular inflated, rotate or broadly bell-shaped; limb oblique or rarely nearly equally spreading, often more or less 2-lipped, usually 5-lobed. Stamens 4 or 2, often with cohering anthers; the fifth stamen rudimentary. Ovary inferior, half superior, or superior, 1-celled. Fruit capsular or rarely fleshy.

MITRARIA (MITRE FLOWER). — A genus with only one species:—

M. coccinea. — A brilliant flowered Chilian dwarf evergreen shrub, with climbing stems, and opposite rather leathery ovate acute, small leaves with a few teeth. Flowers from May to July, bright scarlet, about 1½ in. long, solitary and axillary. Calyx free, 4–5-parted. Corolla tube elongated, inflated, with 5 nearly equal rounded spreading lobes. Stamens 4, protruding. Ovary superior. Fruit a globose berry.

Culture and Propagation. — This pretty plant flourishes in a mixture of sandy peat and loam, and may be considered almost hardy in favourable parts of the country except in very severe winters. It has been known to pass uninjured through 15° of frost. It may be increased by carefully dividing the roots in spring. Cuttings of the tops of the shoots may also be inserted in light sandy soil under a handlight any time during the spring and summer months.

SARMIENTA repens is another Chilian creeping shrub with small, fleshy, opposite, entire or toothed leaves and scarlet flowers, closely related to *Mitraria*, but it is not so hardy, or at least is usually grown in greenhouses. It might, however, be tried out of doors in the southern parts of England and Ireland in moist, shady, and sheltered parts of the rockery. It requires plenty of light and water in summer, in peaty soil, but not strong sunshine.

PRIMULINA (ROCK TOBACCO).—A new genus containing only one species at present known:—

P. Tabacum (*P. sinensis*).—A distinct and interesting hairy perennial 4–6 in. high, native of N. China, with roundish heart-shaped, shallowly lobed leaves 3–4 in. across, and stalks about 3 in. long. The violet-purple Primula-like flowers, about ¾ in. across, are borne in summer in loose corymbs, wild specimens having as many as 12–20 on the hairy scape.

Culture and Propagation.—The flowers of this plant are so much like those of a Primula that at first sight might easily be mistaken for one. It derives its name of Rock Tobacco from the fact that the living plants exhale a powerful odour of Tobacco, especially when the leaves are gently passed through the hands. The plant is rather delicate in constitution and requires some little care in cultivation. It would look charming in masses in the rockery, but until it becomes more widely distributed it is safer to grow it in pots or cold frames. It might be increased by division in spring, but if seeds are ripened it is preferable to raise plants from them, so as to induce a hardier and more vigorous growth by acclimatisation.

CONANDRON.—A genus containing only one species here described with the generic characters :—

C. ramondioides.—A pretty perennial native of moist places on the Japanese mountains. It grows about 6 in. high and resembles the Ramondias and Haberlea in habit. The oblong ovate leaves are about 6 in. long, and are smooth and shining, but more or less wrinkled, and with irregularly toothed margins. The flowers appear in June and July, several on the top of a stem about 6 in. high, covered with brown shaggy hairs. The calyx is 5-parted with linear lance-shaped segments. The corolla is more or less rotate with 5 heart-shaped lanceolate lobes. Stamens 5, surrounding the cylindrical pointed style.

Culture and Propagation.— This species flourishes in rich well-drained peaty soil, and may be grown with the Ramondias. It is easily increased by division after flowering in spring, the rhizomes being pegged down.

RAMONDIA.—A genus of 3 species of almost stemless herbs with radical, softly wrinkled, rusty, hairy, or woolly leaves in rosettes. Scapes without leaves, 1 or few-flowered. Calyx free, 5–4-, rarely 6-parted, with ovate or oblong segments. Corolla violet or pale purple, rotate or broadly bell-shaped, 5–4-, rarely 6-cleft, with broad and nearly equal lobes. Fertile stamens equal in number to the corolla lobes and attached to the base. Ovary superior, conical. Capsule oblong with minute seeds.

R. Heldreichi (*Jankæa Heldreichi*). A native of Thessaly with entire leaves covered with a whitish silky down. The flowers are purplish, but only one or two are borne on each stem.

Culture &c. as below for *R. pyrenaica.*

R. pyrenaica (*Verbascum Myconi*).—*Rosette Mullein.*—A charming Pyrenean perennial with rosettes of wrinkled, ovate, deeply toothed, rusty-haired leaves, and rotate purple flowers over 1½ in. across, with a bright yellow centre in May and June, 3–4 on a stoutish scape about 3 in. high. There is a beautiful white-flowered variety named *alba*, which is now fairly common. The flowers are as large as, if not larger than, those of the type, and the almost pure white petals have a blood-red stain at the base which looks very handsome.

Culture and Propagation. — This species flourishes in well-drained peaty soil and is an ideal plant for growing in the fissures of rocks so that the rosettes of leaves lie flat on the surface. When grown in masses they are very effective. A splendid cluster of them has been growing freely on the face of an almost vertical wall in a shady part of the rockery at Kew for some years past.

R. pyrenaica may be increased by seeds or division of the tufts. The seeds should be sown as soon as ripe, and being very small require only the very slightest covering of soil or none at all. They may be placed in a cold and moist shady frame, and when large enough to handle may be pricked off and grown on until spring before planting them in the rockery.

Increase by division is best performed after flowering is quite over, say about July and August. The side shoots should be detached and planted in fine peaty soil and kept close, moist, and shaded until established. They should be grown in pots in cold frames during the winter and planted out early in spring. Clean healthy leaves, severed with a sharp knife as close to the base as possible, may also be used to increase the number of plants. If treated in the same way as the side shoots, and placed in leaf mould and sandy loam, they will soon root, but they must not be kept excessively damp, otherwise the leaves are apt to rot.

R. serbica.—A pretty species, native of Servia and Thessaly, with rather thick, bluntly ovate entire leaves about

1 in. long, silky-white above, and rusty-woolly beneath. Flowers in early summer, yellow, bell-shaped, with 4 obovate, nearly equal segments, and 1–2 on a scape.

Culture &c. as above. This species may be treated like *R. pyrenaica.* There is a variety called *Nathalie*, which is said to be very free-flowering.

HABERLEA.—A genus with only 1 species:—

H. rhodopensis.—A charming little Roumelian rock plant 4–6 in. high with rosettes of thickish coarsely toothed, bluntly obovate oblong leaves closely resembling those of *Ramondia pyrenaica.* Flowers in April and May, pale lilac, 1 in. across, drooping in umbels, 2–5 on a stoutish scape. Calyx bell-shaped, 5-cleft. Corolla tube broadly bell-shaped, widened at the mouth, limb 2-lipped, the upper lip 2-cleft, the lower one 3-cleft, and about twice as long, all the lobes rounded. Fertile stamens 4, didynamous, with cohering anthers. Ovary superior. Capsule somewhat enclosed by the calyx.

Culture and Propagation. — This species may be grown under exactly similar conditions to the *Ramondias.* It flourishes in fibrous peat, and looks charming fixed in clefts between rocks, in a position facing north. In the absence of a rockery it will thrive in a shady part of a peaty border among Rhododendrons, Azaleas, and other Ericaceous plants. There are forms known as *robusta* and *grandiflora*, both more vigorous than the type. The plants may be raised from seeds in the same way as *Ramondia*, and also by means of careful division.

LXXXIV. BIGNONIACEÆ—Bignonia Order

A rather large order of trees, shrubs, rarely herbs, often twining and climbing, with opposite, rarely alternate, often compound or simple leaves without stipules. Flowers hermaphrodite, more or less irregular, in terminal panicles. Calyx inferior, gamosepalous, entire, lobed, or spathe-like. Corolla gamopetalous, tubular, funnel-shaped, or somewhat bell- or salver-shaped, with 5 more or less spreading lobes. Stamens 5, unequal, 1 always sterile, sometimes 3. Fruit a dry, frequently woody, capsule, often long and more or less compressed.

The representatives of this order (there are about 450 species) are chiefly natives of the Tropics, and many of them are noble-looking trees.

BIGNONIA.—A genus of high climbing shrubs with opposite, simple, conjugate, ternate, digitate or pinnatifid leaves, the terminal lobe of which often ends in a tendril. Flowers axillary or terminal, usually in panicles. Calyx bell-shaped or tubular, entire or slightly toothed. Corolla tube often elongated, straight, or incurved; limb distinctly or slightly 2-lipped and 5-lobed. Fertile stamens 4, didynamous, with a rudiment of a fifth, rarely slightly protruding. Ovary almost sessile or shortly stalked. Capsule linear, often elongated.

B. capreolata.—A handsome smooth N. American climber with conjugate leaves composed of heart-shaped-oblong leaflets and terminal branched tendrils. Flowers from May to August, large, orange-yellow, tubular bell-shaped, numerous. The variety *atrosanguinea* has reddish-purple flowers.

Culture and Propagation. — This species is the only one out of about 100 or more that may be considered hardy or almost hardy in the most favourable parts of the south of England and Ireland, although it will stand a few degrees of frost in the Thames Valley when grown against a south wall. In northern parts it is usually grown as a greenhouse climber.

It flourishes in good, well-drained, sandy loam and leaf soil. Perhaps the best way to increase the plant is by layering the lower branches during the summer and autumn months, and not detaching them until the following spring. Cuttings of the young shoots will root in bottom heat under bell-glasses in spring, but care must be taken not to get them too damp at first or they will rot. They often take 2 or 3 months to develop roots properly, after which, if well established, each one may be put into a pot in rich, light, sandy soil and leaf mould and kept close and shaded for a week or so until it has recovered from the change. By the following spring the plants may be sturdy enough for placing outside in warm, sheltered spots.

CATALPA. — A genus containing about 6 species of smooth or downy erect trees or shrubs with large opposite or ternately whorled, oblong ovate or broadly heart-shaped leaves. Flowers in forked panicles or corymbs at the ends of the branches. Calyx membranous, 2-lipped. Corolla tubular bell-shaped, 2-lipped, with 5 rounded lobes. Fertile stamens 2, the 3 others small and imperfect. Capsule linear, rounded, 1 ft. or more long. Seeds with a white silky down.

Culture and Propagation.—Catalpas flourish in rich loamy soil in situations somewhat sheltered by other trees. They are noble-looking trees on lawns and grass land even when only simply in leaf. They may be increased by seeds sown in spring in gentle heat or cold frames. The branches may also be layered during the summer and autumn, and cuttings of the ripened shoots may be inserted in sandy soil under handlights in autumn. Or the rarer kinds like *C. Bungei* may be grafted on seedlings of *C. speciosa* or *C. bignonioides* in spring.

C. bignonioides (*C. syringæfolia*).—A noble ornamental tree 20–40 ft. high native of N. America. Leaves ovate heart-shaped, pointed, 6–10 in. long, 5–7 across at the widest part, smooth above, downy beneath. Flowers in July, white, tubular, bell-shaped, about 2 in. across the mouth, with 5 spreading, roundish segments, having fringed or toothed edges, the throat and lower lip being speckled and blotched with purple on a yellow ground. Some flowers in the same cluster have deep purple bands down the throat, others not. Calyx 2-lipped, purple, downy; pedicels purple. Fruit pods slender, roundish, deep dull purple and 12 in. or more long.

Culture &c. as above.

C. Bungei.—A fine Chinese shrub 8–10 ft. high, with ovate, taper-pointed, entire or lobed leaves. Flowers in summer, large, greenish-yellow with red spots.

Culture &c. as above. A rather tender plant, best for the south of England and Ireland.

C. hybrida.—This is a hybrid between *C. speciosa* (*cordifolia*) and *C. Kæmpferi*, and more nearly resembles the latter in appearance. The leaves, however, are more irregular in form, and are somewhat heart-shaped at the base, but suddenly taper to a slender point at the apex. The under surface is downy as in *C. bignonioides*, and the flowers are also like those of that species.

Culture &c. as above.

C. Kæmpferi. — A beautiful Japanese tree with ovate heart-shaped, abruptly sharp-pointed leaves, often with one or more sharp-pointed side lobes. Flowers in July, small, sweet-scented, clear yellow, spotted with purple-brown, lobes toothed.

Culture &c. as above. Suitable only for the mildest parts of the country.

C. speciosa.—A fine ornamental tree, native of the United States and resembling *C. bignonioides* in habit. It is distinguished by its softly downy leaves, less crowded racemes of large white flowers, which appear two or three weeks earlier, and larger fruit and seeds. This tree is now also called *C. cordifolia*, a name that was also at one time applied to *C. bignonioides*.

Culture &c. as above.

TECOMA (TRUMPET CREEPER; TRUMPET FLOWER).—A genus containing about 24 species of erect and tree-like climbing and twining shrubs without tendrils, as in *Bignonia*, with which genus they are often confused. Leaves opposite, rarely scattered, pinnate or undivided, often with toothed leaflets. Calyx tubular, bell-shaped, nearly equally 5-toothed. Corolla tube elongated, straight or incurved, sometimes slightly enlarged or inflated, sometimes widened in a bell-shaped throat; limb somewhat 2-lipped, with 5 almost equal broad more or less spreading lobes. Stamens 4, didynamous, occasionally protruding. Capsule linear or narrowly elliptic. Seeds winged.

Culture and Propagation.—Tecomas are beautiful plants when well grown. They succeed best in rich, loamy, well-drained soil against walls with a south aspect. Only a few species are hardy enough for outdoor cultivation, and in very severe winters most of the over-ground branches are likely to be killed. New shoots, however, will burst from the rootstock in spring. They like abundance of water during the summer months, but prefer dryness at the root during the winter. Fresh plants may be obtained by cuttings of the roots or ripened or partially ripened shoots inserted in sandy soil in heat. Layers may also be made during the summer and autumn months and detached the following spring. Seeds, if obtainable, will sprout in gentle heat when sown in spring.

T. australis (*T. diversifolia; Bignonia Pandorea*).—*Wonga-Wonga Vine.*—An ornamental Australian climber with leaves composed of 5–9 ovate oblong to almost linear, entire, or coarsely crenate leaflets 1–3 in. long. Flowers in summer, in loose terminal panicles, yellowish-white, tinged inside with purple or red.

Culture &c. as above. May be trained against walls with a south aspect in the mildest parts of the kingdom.

T. capensis. — A beautiful, smooth, climbing shrub about 15 ft. high, native of S. Africa. Leaves oddly pinnate with ovate-oblong, serrate leaflets. Flowers in summer, in clustered racemes, orange-scarlet, about 2 in. long, more or less erect, funnel-bell-shaped, with protruding stamens.

Culture &c. as above. This is usually grown in greenhouses, but should prove fairly hardy in the mildest parts of England and Ireland.

T. grandiflora (*Bignonia grandiflora*). — A handsome climbing shrub, 20–30 ft. high, native of China and Japan. Leaves oddly pinnate, with ovate pointed and toothed leaflets. Flowers in July, orange-scarlet, drooping, in terminal racemes.

Culture &c. as above. Except in the very mildest parts, this species does not grow luxuriantly out of doors in this country. It is best in rich loamy soil, against a south wall.

T. radicans (*Bignonia radicans*).—A beautiful N. American shrub, climbing by means of aërial rootlets, as in the Ivy, and often extending for about 25 ft. or more. Leaves oddly pinnate, composed of ovate, taper-pointed, toothed leaflets, downy at the sides of the nerves beneath. Flowers in summer, in terminal corymbs, scarlet-red, 2–3 in. long. Fruit stalked, about 3½ in. long. There is a variety *minor* with smaller but brighter scarlet flowers.

Culture &c. as above. This is the hardiest of the Tecomas, and is well suited for covering walls. When in flower it looks charming.

INCARVILLEA.—A genus containing 3 or 4 species of beautiful perennials, with alternate twice or thrice pinnate leaves, and large flowers in terminal racemes. Calyx bell-shaped, 5-lobed. Corolla tube elongated, widened at the mouth; limb 2-lipped, with 5 rounded spreading lobes. Stamens 4, didynamous. Capsule linear, incurved, with obovate, flat, winged seeds.

Culture and Propagation. — Incarvilleas flourish in light sandy soil, with a little peat or leaf mould, and may be increased by seeds, grown in heat in spring, or division of the roots.

I. Delavayi.—A splendid fleshy-rooted Chinese perennial, 1½–2½ ft. high, with large leaves composed of numerous coarsely toothed leaflets of a deep green. Flowers in May and June, trumpet-shaped, with spreading lobes, bright rosy-carmine, spotted with yellow and brown in the tube, 10–13 in a raceme thrown well above the foliage.

Culture and Propagation. — This fine plant was at first thought too tender for our climate, but it has proved quite hardy, and has not been injured by several degrees of frost. It is easily grown in light rich soil and looks magnificent in large masses or in beds by itself on the lawn. Seeds may be sown early in spring in gentle heat, or later on in a cold frame, the young plants being pricked out and grown on for transplanting about June in the open ground. Seeds sown in September will produce plants for flowering the following spring. Large plants may also be divided early in autumn, care being taken not to injure the fleshy roots more than necessary.

I. Koopmanni.—A smooth erect-growing branched perennial 2–3 ft. high, native of Turkestan. It has pinnately divided leaves, and during the summer months produces racemes of mauve-pink trumpet-shaped flowers at the end of the shoots.

Culture &c. as above for *I. Delavayi.*

I. Olgæ.—This is a handsome perennial, 3–4 ft. high, native of Turkestan. Leaves pinnate, composed of narrow oblong pinnately cut leaflets. Flowers in summer, bright rose or purple, more or less bell-shaped, with short rounded spreading lobes.

Culture &c. as above. This species under favourable conditions presents a fine bushy appearance, and is a good plant for borders, or in groups on grass land. It may be increased like *I. Delavayi*, and grown in similar light rich soil. It must not, however, be kept wet in winter, and it is therefore essential that the soil should be well drained.

I. sinensis.—A pretty Chinese biennial 1–3 ft. high, with leaves twice or thrice pinnately divided into narrow segments, which give the plant a graceful appearance. Flowers from May to August, scarlet, in loose terminal racemes, above the foliage. There is a variety with rose-purple flowers.

Culture and Propagation.—This species is better known on the Continent than in this country. It is not quite so hardy as *I. Delavayi* or *I. Olgæ*, but it may receive similar treatment out of doors. It is raised from seed sown in spring, in gentle heat or cold frames, and grown on till September. During the winter months, when each plant should have a pot to itself, very little or no water is required, and the plant should be protected in a cold frame or greenhouse. In early spring when the first signs of life appear, water may be given, and more frequently as the shoots develop. About April or May they may be planted outside, and will flower profusely the same year.

Another Chinese species is *I. compacta*, with pinnate leaves, and large rosy-pink flowers, but it does not appear to be in cultivation.

ECCREMOCARPUS. — A small genus of elegant, smooth or downy, climbing shrubs, with opposite, twice pinnately cut leaves ending in a branched tendril. Calyx bell-shaped, 5-cleft. Corolla tube elongated, inflated, and contracted at the throat; limb somewhat 2-lipped with 5 short, rounded, nearly equal, spreading lobes. Stamens 4, didynamous. Capsule ovoid or elliptic, with flat, winged seeds.

Culture and Propagation.—These plants flourish in ordinary garden soil, and are useful for training over arbours, porches &c. Although perennials, they are easily raised from seed every year. When sown in gentle heat in March, the seedlings will be ready for planting out at the end of May and will flower in the summer of the same year. To obtain larger plants to flower earlier the following season, the seeds may be sown in cold frames as soon as ripe. The seedlings are pricked out when large enough and grown under glass until mild weather in spring, when they may be planted out. The old rootstock will send up vigorous shoots every spring and is not likely to be killed even in severe winters if protected with litter, ashes &c.

E. longiflorus.—A beautiful Peruvian climber with leaflets pinnately divided into oval, entire, sessile leaflets. Flowers in July, yellow, with a greenish limb, tubular and slightly curved, in many-flowered drooping stalks.

Culture &c. as above.

E. scaber (*Calampelis scabra*). — A charming Chilian climber with angular hairy stems and abruptly twice pinnate leaves ending in a spiral compound tendril; leaflets alternate, obliquely heart-shaped, ovate, serrate, or entire. Flowers in July and August, scarlet or deep orange-red, with an inflated throat, in many-flowered, 1-sided racemes.

This is the better known species, and is very popular owing to its wealth of blossom garlanding porches, arbours, trellises &c.

Culture &c. as above.

LXXXV. PEDALINEÆ

An order of annual or perennial herbs, rarely undershrubs, often with a soft texture and heavy smell. Leaves opposite, or the upper ones alternate, entire, toothed, incised, or pinnately lobed. Flowers hermaphrodite, irregular, axillary, solitary, or clustered. Calyx gamosepalous, usually divided into 5 nearly equal segments. Corolla gamopetalous, tubular, often oblique or decurved at the base and more or less gibbous below; limb slightly 2-lipped with 5 spreading lobes. Stamens 4, didynamous; the fifth stamen small and rudimentary.

Ovary seated on a glandular disc, usually 1-celled, sometimes 2 or rarely 3-4-celled. Fruit a nut-like capsule or rarely drupaceous, often horned or spiny.

MARTYNIA (Devil's Horns).—A genus containing about 10 species of annual or perennial tuberous-rooted, erect, or trailing, clammy, downy herbs. Leaves opposite or alternate, long-stalked, heart-shaped, coarsely sinuate-toothed, or palmately lobed. Flowers rather large, rosy, violet, or pale yellow, in short terminal racemes. Calyx membranous, rather bladdery-bell-shaped, deeply and unevenly 5- lobed or parted. Corolla tube oblique or decurved at the base, scarcely gibbous, broad at the mouth, with 5 broad spreading and somewhat wavy lobes. Perfect stamens 2 or 4; imperfect ones (staminodes) 1 or 3. Fruit drupe-like, ending in 2 curved diverging beaks or hooks like goat's horns.

Culture and Propagation. — The species described below are all annuals and are raised early every spring from seeds sown on a hotbed or in a warm greenhouse. The young seedlings are pricked out and grown on until ready for planting out at the end of May about 1-2 ft. apart. Seeds may also be sown in the open border about May and June. Owing to the hard coats of the seeds they take a rather long time to germinate, but if steeped in warm water for about 24 hours before sowing the seeds will sprout much more quickly. For the treatment of annuals in general see p. 78.

M. fragrans (*Craniolaria fragrans*). A Mexican species about 2 ft. high with opposite, lobed, hairy and clammy leaves heart-shaped at the base. Flowers from July to September, crimson-purple with a yellow throat, exhaling a vanilla-like odour. Fruit remarkable, produced upwards into curved, sharp-pointed, hooked horns, 3-4 in. long.

Culture &c. as above.

M. lutea.—A Brazilian annual, 1-2 ft. high, with opposite, heart-shaped, rounded, toothed leaves, covered with a glandular down. Flowers in August, large, funnel-shaped, orange-yellow tinged with blood-red inside.

Culture &c. as above.

M. proboscidea (*M. annua*).—A bushy Mexican species 1-3 ft. high, having alternate lobed leaves heart-shaped at the base, and emitting a rather nauseous odour especially when bruised. Flowers from July to September, having a yellowish-white tube variegated with green, yellow, and violet spots and lines; limb violet, dotted and lined with deep yellow and dark violet. Known as the 'Unicorn Plant.'

Culture &c. as above.

LXXXVI. ACANTHACEÆ—Acanthus Order

An order of more or less downy herbs or shrubs with usually opposite, entire, toothed, or rarely lobed or dissected leaves without stipules. Flowers hermaphrodite, often irregular, in leafy spikes at the ends of the branches. Calyx 4-5-lobed, inferior, often unequal and sometimes spiny. Corolla gamopetalous, mostly 2-lipped with 5 lobes. Fertile stamens 4, didynamous, or 2, the fifth stamen rudimentary or wanting. Ovary superior, entire, 2-celled. Capsule 2-celled with 2 or more seeds in each cell.

This order contains about 1350 species widely distributed over the warmer parts of the globe. There are a large number of them cultivated in greenhouses in this country, but only a few are fit for outdoor cultivation.

THUNBERGIA.—A genus containing about 80 species of sometimes low somewhat erect herbs, sometimes long climbers. Leaves opposite, ovate lance-shaped, heart-shaped, or hastate. Flowers purple, blue, yellow or white, shortly pedicellate, solitary and axillary, or in terminal racemes. Calyx ringed, sometimes very short, truncate, or 10-15-toothed, and often enclosed by 2 ovate or lance-shaped leafy bracteoles. Corolla tube incurved or oblique, often flattened, widened above; limb spreading with 5 broad, roundish lobes, twisted in bud. Stamens 4, didynamous, with smooth or bearded anthers. Capsule thick and leathery, abruptly narrowed into a sword-like beak.

T. alata.—A pretty velvety S. African annual climber with stalked, heart-shaped, sagittate leaves having winged stalks. Flowers in summer, 1½ in. long, purple below, with a curved tube and a bell-shaped limb. Calyx 10-12-toothed, enclosed by 2 ovate-acute bracteoles. The white-flowered forms are *alba* and *Bakeri*; *aurantiaca* is orange-coloured; *Fryeri*, orange with a white throat; *sulphurea*, pale yellow; and *Doddsi*, pale orange with a rich purple-violet throat, and leaves irregularly edged with white.

Culture and Propagation.—*T. alata* and its several varieties are valuable for covering trellises, arbours, porches, old tree-stumps, walls &c. during the summer and autumn. They are raised from seeds sown in heat in March, and grown on and planted out in June in ordinary garden soil. They are of the easiest cultivation and are very handsome when in bloom. A packet of mixed seed will probably give all the varieties mentioned, and if their stems are allowed to ramble about together, the various coloured flowers produce a fine effect.

All the other species of *Thunbergia* require greenhouse treatment.

ACANTHUS (Bear's Breech).—A genus containing about 14 species of tall, Thistle-like herbs or shrubs, having radical or opposite leaves, sometimes very large, sinuate-toothed or pinnately divided, with spiny teeth, or rarely almost entire. Flowers white or blue, sessile, crowded, in dense or interrupted spikes. Bracts sometimes large and spiny-toothed, sometimes smaller, quite entire, or rarely obsolete; bracteoles narrow, entire or spiny-toothed. Calyx 4-parted. the 2 outer ones large-veined or cartilaginous at the base. Corolla tube short, somewhat bell-shaped, often cartilaginous; the lower lip broad and flat, 3-5-lobed. Stamens 4, with cohering bearded anthers. Capsule ovoid or oblong, leathery, containing 4 or fewer seeds.

Culture and Propagation.—The Acanthuses succeed best in a well-drained, deep, rich, sandy loam, and warm, sunny situations, but they also attain handsome proportions in ordinary, well-worked garden soil, and in partially shaded but airy positions. They may be increased by dividing the roots in autumn, or preferably in spring. Seeds may also be sown in gentle heat in March, the young seedlings being pricked off singly into small pots, and grown on until the end of May, when they can be transferred to the open border. Cuttings of the roots inserted in sandy soil early in the year, with a little bottom heat, may also be used for increasing the stock of plants.

Acanthuses are highly ornamental and picturesque plants, and are more valued for their noble appearance than for the splendour of their flowers. They may be used in many ways in the border, in nooks of the rockery, on old ruins &c., but they are admirably adapted for growing as isolated specimens on lawns, where their beauty can be seen to the best advantage. *A. mollis* and *A. spinosus* are interesting, inasmuch as they have been more often conventionalised in sculpture and decoration than almost any other plants. The former is said to have suggested the idea of the Corinthian Capital to Callimachus, who lived about the end of the fifth century before the Christian Era.

A. longifolius. — A beautiful Dalmatian perennial 3–4½ ft. high, with numerous radical, pinnately divided leaves, 2–3 ft. long. Flowers in June, rosy-purple, in dense spikes about 1 ft. long, having spiny, reddish bracts, veined with green.

Culture &c. as above. Increased by division and seed.

A. mollis.—A vigorous Italian perennial 3-4 ft. high, with large, heart-shaped, lobed and toothed leaves, about 2 ft. long and 1 ft. broad. Flowers in summer, white, rose, or lilac, in the axils of deeply toothed bracts, and borne on spikes about 18 in. long, thrown well above the foliage.

The variety *latifolius* (also known as *A. lusitanicus*) is perhaps the finest of all the Acanthuses. It is larger in every way than *A. mollis*, with more leathery, rigid, and broader leaves, less deeply cut, and the flower-stems often attain a height of 5 ft., when the plants are grown in rich warm soil. A beautiful plant for sub-tropical effects on the lawn. It grows practically all the year round. Planted out in spring it soon pushes forth vigorous growths, and its flowers appear from June to August. In the autumn it may be lifted and placed in large pots or tubs, and transferred to the conservatory, if there is sufficient room, and its fine leaves will retain their green freshness, and new ones even will be developed, thus rendering the plant a useful winter ornament. In cold bleak parts of the country it requires a slight protection in severe winters. Increased by seed and division.

A. spinosissimus.—A distinct and handsome species, about 3½ ft. high, native of S. Europe. Leaves tufted, leathery, pinnately divided, blistered and densely armed with sharp, white spines. Flowers in summer and autumn, rosy flesh-colour, in spikes 12–18 in. high, furnished with acute recurved and very spiny bracts.

Culture &c. as above. Increased by division and seed.

A. spinosus.—A beautiful species 2–4 ft. high, native of Central and S. Europe. Leaves pinnately cut into regular divisions, each ending in a short, stiffish spine. Flowers in summer, purplish, in the axils of spiny bracts on tall spikes.

Culture &c. as above. This is perhaps the hardiest species of all and also the most free-flowering. It may be increased by division, seeds, or root cuttings.

DIANTHERA (Water Willow).—A genus containing 80 species of erect, ascending, diffuse or trailing herbs with entire or rarely toothed leaves. Calyx deeply divided in 5 or 4 narrow awl-shaped segments. Corolla tube slender, straight or incurved; limb 2-lipped. Stamens 2. Staminodes none.

D. americana (*Justicia pedunculosa*). A pretty N. American water perennial 1–3 ft. high with narrow lance-shaped almost stalkless leaves 3–4 in. long. Flowers in summer, pale violet or whitish, less than ½ in. long, several in a head.

Culture and Propagation.—This plant is suitable for growing at the edges of streams, ponds &c. It may be increased by cuttings of the green shoots under a handlight, or by seeds sown in spring in gentle heat.

LXXXVII. SELAGINEÆ—Globe Daisy Order

A small order of shrubs or undershrubs, often Heath-like in appearance, or perennial tufted herbs or rarely small annuals. Leaves alternate, or the lower ones rarely opposite or radical, entire or toothed, often narrow or leathery. Flowers hermaphrodite, irregular, white, blue, or rarely yellow, in dense rounded or oblong terminal or very rarely axillary spikes. Calyx inferior, 5-cleft or parted, or owing to some of the segments being united or absent, variously 3-parted, 2-parted, or spathe-like. Corolla gamopetalous shortly and slenderly tubular at the base, sometimes widened at the throat; limb normally 4–5-lobed, spreading. Stamens didynamous, or rarely 2. Ovary superior, usually 2-celled. Fruit small, enclosed by the calyx.

GLOBULARIA (Globe Daisy).—A genus containing about a dozen species of undershrubs or herbaceous perennials. Leaves radical or alternate, leathery obovate oblong or lance-shaped, entire or with a few sharp teeth. Flowers blue, rather small, collected in a globose terminal head and surrounded by a many-leaved involucre, or rarely dense clustered and axillary. Calyx more or less bell-shaped, 5-lobed, or slightly 2-lipped. Corolla oblique 3–5-lobed, 2-lipped. Stamens 4, didynamous. Ovary 1-celled. Fruit small, 1-seeded.

Culture and Propagation. — Globularias are suitable for the border or rock garden. They like a rich, free, sandy loam, and warm sheltered situations, and are increased by seed sown in spring, or by division in early autumn. To make a show it is necessary to grow several plants together.

G. Alypum. — A somewhat tender S. European species about 2 ft. high, having lance-shaped entire or 3-toothed leaves. Flowers in August and September, pale blue, in rounded terminal heads.

Culture &c. as above. Often grown as a greenhouse plant, but in the southern parts of the country grows very well and requires shelter only in bad winters.

G. cordifolia.—A trailing shrub about 6 in. high, native of Central and S. Europe. Leaves stalked, heart-shaped, notched at the apex with one or two teeth. Flowers in early summer, blue, in small rounded heads.

Culture &c. as above. Suitable for the rockery, trailing over the faces of rocks.

G. nana. — A dense trailing Pyrenean species 1–2 in. high, forming a thick mass of Thyme-like verdure. Leaves fleshy glistening narrowly obcordate. Flowers in summer, bluish-white, in round heads about ½ in. across, just rising above the foliage.

Culture &c. as above. May be grown as a rock-plant or as a carpet in the front of borders. It may be increased by dividing the rooting stems.

G. nudicaulis.—A native of S. Europe about 6 in. high, with herbaceous stems, and radical bluntly oblong or spoon-shaped crenate leaves about 2 in. long, and distinctly 3-nerved. Flowers in May and June, blue, in smallish rounded heads about an inch in diameter.

Culture &c. as above. Suitable for rockery or front of border.

G. trichosantha. — A somewhat glaucous species 6–8 in. high, native of Asia Minor, with herbaceous leafy stems. Radical leaves spoon-shaped, sometimes 3-toothed, those of the stem nearly linear mucronate. Flowers in summer, sky-blue, in large rounded heads, the corolla lobes being cut into fine thread-like divisions.

Culture &c. as above. Rockery or border.

G. vulgaris. — A native of S. Europe with erect herbaceous stems 6–12 in. high. Radical leaves spoon-shaped, emarginate, or shortly 3-toothed, those of the stems small lance-shaped. Flowers in summer, bright blue, in dense rounded heads.

Culture &c. as above.

LXXXVIII. VERBENACEÆ—Vervain Order

A natural order of herbs, shrubs, or trees. Leaves (except in a few genera) opposite or whorled, entire toothed or incised-multifid, pinnate in one genus, digitately compound in another. Stipules none. Flowers hermaphrodite, or rarely polygamous by abortion, irregular or regular in a few genera, in corymbs, spikes or heads, rarely solitary. Calyx tubular, persistent, inferior, usually 5-toothed or lobed. Corolla gamopetalous, the tube often incurved and cylindrical; limb 5–4-cleft, with equal lobes, or more or less 2-lipped. Fertile stamens 4, didynamous, or only 2. Ovary superior, sessile, terminating in a simple style. Fruit more or less drupe-like or rather capsular, 2–4-celled, each cell with one seed.

About 700 species belong to this order and are chiefly natives of the warmer parts of the globe. Only the genera and species described below are hardy enough for outdoor gardening in the British Islands.

LANTANA. — A genus containing 40–50 species of downy or hairy shrubs or herbs, with an erect or climbing habit. Leaves opposite, toothed, often wrinkled. Flowers red, orange, white, or variously coloured, in stalked, axillary heads. Calyx small, membranous, truncate or sinuate-toothed. Corolla tube cylindrical, slender, with a spreading 4–5-lobed, equal or obscurely 2-lipped limb. Stamens 4, didynamous. Ovary 2-celled. Fruit drupe-like.

L. Camara (*L. aculeata*).—A vigorous species, native of tropical America, with much-branched, more or less prickly stems, which form in old plants, especially if the tips have been pinched out, fine bushes 3–5 ft. or more high. Leaves ovate or oblong, pointed, wrinkled and toothed, of a deep green, and emitting a rather disagreeable smell when bruised. Flowers in summer, numerous, collected in round heads on stiff stalks thrown well above the foliage, colour at first clear yellow, passing into golden- or orange-yellow, afterwards tinged with red. Fruit a roundish, drupe-like berry, black when ripe, and containing 2 stony seeds.

This is the species from which the

numerous beautiful garden varieties are supposed to be derived by selection and fertilisation, but there can be little doubt that other species like *nivea*, white, *crocea*, bright red, with a yellow centre, and perhaps others have had their share in producing them, as they have all been known to cultivation for very many years.

The hybrid or garden Lantanas are remarkable for the freedom with which they produce their flowers during the summer and autumn months. They display a great range of colour, including pink, white, flesh-colour, lilac, crimson, yellow, orange. With the exception of pure white, the flowers of other colours have the peculiarity of gradually passing from one shade to another, a chameleon-like process, which is at once interesting and beautiful.

Culture and Propagation. — At one time it was usual to name choice varieties of Lantanas, such as *Bouquet*, *Blanc*, *Don Calmet*, *Eldorado*, *Fabiola*, *Globe d'Or*, *La Neige*, *Meteor*, *Ne Plus Ultra*, *Ver Luisant*, *Victoire* &c., but as a packet of mixed seeds will yield all the colours supposed to be the copyright of such names, it is unnecessary to have named varieties, especially as they can never be relied upon to come true from seeds. The only safe way to increase the stock of an exceptionally fine variety is by cuttings. These may be taken in August and September from the side shoots, without flowers, and inserted in sandy soil in shallow boxes, pots &c., and placed in the greenhouse or on a hotbed until rooted. Cuttings of the young shoots may also be taken in spring and will soon root on a hotbed.

During the winter months and until May the plants require greenhouse protection. But from the end of May until October they make effective bedding or border plants, and should be grown in masses or groups to obtain the best effect, not dotted about here and there in single specimens. The old plants may be cut back in autumn, and potted up for greenhouse or conservatory decoration in spring.

Besides cuttings, Lantanas are also easily raised from seed sown in hotbeds in February and March. When 3-4 leaves have been formed the seedlings may be pricked off into small pots, and still grown on in gentle heat until well rooted and established. After this, somewhat cooler quarters, and an increasing amount of air, with plenty of light, are required to harden the plants off, and induce dwarf, sturdy growth, so that they will be quite fit for transferring to the open ground at the end of May or beginning of June.

Lantanas thrive in any good garden soil, well enriched with leaf-mould and decomposed manure. Generally speaking they may be grown in the same way as Heliotropes (see p. 670) or Verbenas.

LIPPIA.—A large genus containing about 90 species of smooth or hairy shrubs, undershrubs, or rarely herbs. Leaves opposite or 3 in a whorl, rarely alternate, entire, toothed or lobed, flat or wrinkled. Flowers small, solitary, sessile in the axils of the bracts, and borne in long, graceful, or densely cylindrical spikes, or collected into a head. Calyx small, membranous. Corolla tube cylindrical, straight or incurved, with an oblique, spreading 4-lobed, and somewhat 2-lipped limb. Stamens 4, didynamous. Ovary 2-celled. Fruit small, dry, enclosed by, and sometimes attached to, the calyx.

Culture and Propagation. — Only a few species are in cultivation. They all like a light rich soil, and are easily increased by cuttings of the young shoots almost at any time of the year, inserted in sandy soil, and placed in a warm greenhouse.

L. canescens (*L. repens*). — A small creeping plant, native of Peru, more or less covered with hoary hairs, and having rooting stems rarely exceeding 4–6 in. high. Leaves oblong lance-shaped, and toothed towards the top. Flowers from June to September, clear lilac, in round heads at the top of slender thread-like stalks springing from the axils of the leaves.

Culture and Propagation. — This is a good plant for dry parts of the rockery, the edges of beds or borders &c. in mild and warm parts of the country, in any well-drained garden soil. It is easily increased in spring, summer, or autumn by detaching portions of the branches which root naturally in the soil. In cold parts of the country a little protection in winter may be needed.

L. citriodora (*Aloysia citriodora*; *Verbena triphylla*). — This is the well-known and popular Lemon or Sweet-scented Verbena, remarkable for its delightful Lemon scent, particularly noticeable when the branches and leaves are passed through the hand. It is a native of Chili, and grows several feet high in favourable parts of England, such as Devonshire and Cornwall, and the south of Ireland. Leaves in whorls of 3, light green, narrow-oblong, toothed, 2–3 in. long. Flowers in summer, small, whitish or pale lilac, on slender spikes.

Culture and Propagation.—Except in mild southern and western parts the Lemon-scented Verbena cannot be considered hardy, but it may do very well in many parts outside, if protected by mats or litter during the winter. Around Bournemouth it flourishes, and in this neighbourhood it is recorded as having been uninjured by 15° of frost. Easily increased by cuttings. To prevent the plants becoming too straggling the branches should be cut back every year, in autumn or winter. The oil extracted from this species forms one of the ingredients of some hair restorers.

L. nodiflora (*Zapania nodiflora*).—*Fog Fruit.*—A tufted creeping perennial 6–12 in. high, native of N. America, with spoon- or lance-shaped roughish serrate leaves about 1 in. long. Flowers from May to September, white, pale blue, or purple, in dense roundish heads on axillary stalks.

Culture and Propagation.—This is a useful plant for bare places in the rockery in any ordinary soil. Increased by cuttings in sandy soil in cold frames during spring and summer.

VERBENA (Vervain).—A genus of annual or perennial herbs or under-shrubs with opposite or rarely ternately whorled or alternate leaves, toothed or often incised or dissected, rarely entire. Flowers in terminal spikes, sometimes crowded in heads, sometimes distant. Calyx 5-ribbed and irregularly 5-toothed. Corolla tube straight or incurved, with a salver-shaped 5-lobed spreading limb, regular, or more or less 2-lipped. Stamens 4, didynamous, very rarely 2. Ovary entire at the apex, or shortly 4-lobed. Fruit enclosed by the calyx, dry, splitting into 4 one-seeded nutlets.

There are about 80 species of Verbena, mostly native of tropical and sub-tropical America. Only a few of the native species are to be found in cultivation, chiefly perhaps in botanical collections. The garden Verbena, like the Lantana, has been produced by selecting and crossing one or more species, the supposed progenitors being *chamædrifolia*, scarlet; *incisa*, rosy purple; *phlogiflora*, purple or lilac, varying to red and blue; and *teucrioides*, white or pinkish. The amalgamation of these species is sufficient to account for the many beautiful shades of colour found in the garden Verbena. But a curious fact is that they all more or less conform to the botanical characters of the typical *V. teucrioides* which may be briefly described as follows, chiefly for the purpose of identification.

V. teucrioides (*V. Niveni; V. scordioides*).—A native of Brazil about 2 ft. high, with more or less hairy branched stems which partly trail along the ground, and root at the joints. Leaves nearly sessile, ovate or oblong, triangular, unequally incised and toothed, and more or less wrinkled. Flowers white or pinkish, large, sweet-scented at night, and borne in terminal, solitary, glandular hairy spikes or heads.

The garden Verbenas have a great tendency to variation when raised from seed, and for this reason many new shades of colour are obtained every year almost. With the exception of pure yellow and black, it may be said that every other shade of colour is to be found in the garden Verbena, from the purest white and deepest blue to the most brilliant red, passing through all the intermediate shades of rose, blue, lilac, maroon, purple, crimson, brown, lavender &c.

The varieties most sought after are those having a large rounded or slightly conical truss of flowers in preference to those in flat or depressed umbels, and the individual flowers should be large, spreading, flat, regular, with rounded and not deeply notched lobes, and of a clear lively and uniform colour, with a distinct round and differently coloured eye in the centre.

A few distinct strains have appeared. That known as *auriculæflora* or Auricula-flowered Verbena is a distinct modification of the ordinary type. The flowers are large, rounded and regular, and have been compared to Auriculas, hence the name, the likeness being strengthened by a distinct white 'eye' in the centre of a clear and deeper ground colour.

The Italian or variegated or striped Verbenas originated in Italy, and are remarkable for their large flowers having stripes or bands of red, rose, blue, purple, carmine &c. radiating from the centre to the circumference on a white ground. Sometimes in the same cluster of flowers may be seen some striped, some of a uniform colour, and others half one colour and half another, or half striped and half self-coloured. These peculiar varieties are best increased by cuttings, as seeds give only a small proportion of variegated flowers.

Culture and Propagation.—Garden Verbenas flourish in light garden soil enriched with leaf-mould and decomposed manure. They are easily raised from seeds sown about the beginning of February to the end of March and April for a succession on a hotbed or warm greenhouse. When large enough to handle easily the seedlings may be pricked singly into small pots in light rich soil and grown on for some time in the same place where they were raised. About April they may be placed in larger pots, and by the end of May, having in the meantime been grown in cooler and more airy quarters, they will be ready for the flower garden, leaving a space of 6–12 in. between the plants. By pegging the stems down they will throw up shoots from the leaf axils, and as almost every shoot ends in a cluster of flowers, the effect during the summer and early autumn months is magnificent.

Seedlings are so easily raised in the way mentioned that it really is not worth while to increase Verbenas by cuttings except in the case of very fine varieties. Cuttings are best obtained in early spring from the stools of old plants which were lifted in autumn, cut back hard, and grown on in a warm greenhouse. They may be inserted in light sandy soil on a hotbed, and when rooted may be grown on in the same way as the plants obtained from seed.

V. venosa. — A beautiful Brazilian species about 2 ft. high. Leaves somewhat stem-clasping, oblong wedge-shaped entire, crenate-toothed, wrinkled and roughish above, strongly haired beneath. Flowers from June to October, bluish-violet or lilac, in umbel-like heads.

Culture and Propagation.—This is an excellent species for beds or groups mixed with other plants. Its flowers last longer than those of the hybrid varieties and are not so much spoiled by drenching rains. It may be increased by cuttings of the young shoots in spring from old plants grown in greenhouses during the winter. Seed may also be used, but as it takes a rather long time to germinate should be sown as early as the middle of January so as to obtain plants sufficiently early for planting out. If the seeds are steeped in warm water for a few hours, they will probably germinate more freely.

The branches of *V. venosa* may be pegged down in the same way as the garden forms so as to give a broad carpet of flowers.

Other species of Verbena sometimes met with are *Aubletia* and its varieties, *Drummondi*, and *Lamberti elegans*, an annual with blue flowers, *incisa* and *tenera.*

VITEX (Chaste Tree; Hemp Tree; Monk's Pepper Tree). — A genus of smooth, hairy or downy trees or shrubs. Leaves opposite, often digitately compound or simple. Flowers white, blue, violet or yellowish, in terminal or axillary panicles or cymes. Calyx bell-shaped 5-toothed. Corolla salver-shaped, with a cylindrical straight or slightly incurved tube, and an oblique somewhat 2-lipped limb having 5 spreading lobes. Stamens 4, didynamous, often protruding. Fruit a more or less fleshy drupe.

V. Agnus-castus.—An aromatic shrub 6–12 ft. high, native of S. Europe. Leaves long-stalked, usually composed of 5–7 lance-shaped taper-pointed leaves, entire or sometimes toothed, and whitish beneath. Flowers in August, pale lilac or violet, in interrupted spikes at the ends of the branches.

Culture and Propagation. — This species is the only one out of about 60 that can be grown out of doors in favourable parts of the British Islands. It will thrive in ordinary good well-drained garden soil that is not too moist, and may be increased by cuttings of the ripened shoots in autumn placed under a handlight in good sandy soil. *Vitex incisa* an Indian shrub with purple flowers would seem to be quite as hardy in the south as *V. Agnus-castus*, but is not so well known.

CLERODENDRON.—A large genus of trees or shrubs, sometimes climbing, having opposite or rarely ternately whorled entire or rarely toothed or angled leaves. Calyx bell-shaped, rarely tubular, truncate, 5- toothed or cleft. Corolla tube slender cylindrical, straight or incurved; limb spreading or somewhat reflexed 5-cleft; lobes nearly equal, or the 2 upper ones much shorter than the others. Stamens 4, much protruding. Ovary imperfectly 4-celled. Drupe globose or ovoid, often 4-lobed or furrowed.

Culture and Propagation.—There are about 70 species, mostly natives of tropical countries. Those described below are the only ones suitable for outdoor cultivation in the more favourable parts of the British Islands. They will pass without much injury through mild winters, but suffer a good deal in severe ones if unprotected. A good sandy loam enriched with leaf soil and manure suits them best. They may be increased by seed sown in heat in spring, and grown on until June or for a whole season in greenhouses, before planting out. Cuttings of the young shoots in spring will root in bottom heat under glass. In autumn pieces of the stem 3-6 in. long inserted in sandy soil and plunged in bottom heat will also root. Cuttings of the roots in bottom heat will produce young plants if inserted in nice sandy soil about January. When the new plants have become well-established they may be potted up separately, and afterwards gradually hardened off preparatory to planting them in the open air. When suckers are produced they may be detached with as many roots as possible in autumn and planted in rich soil in warm sheltered places. Any branches near the ground may also be layered during the summer and autumn months and severed the following spring.

C. fœtidum (*C. Bungei*). — A handsome Chinese shrub about 5 ft. high, with large downy heart-shaped taper-pointed toothed leaves on slender violet-purple stalks and veins. Flowers in August, lilac-rose, borne in dense terminal corymbs.

Culture &c. as above. This species although ornamental has a very disagreeable odour, especially when the leaves are passed through the hands.

C. trichotomum.—Another handsome shrub or small tree 6–20 ft. high, native of Japan. Leaves stalked, ovate serrate, tapering at both ends. Flowers in August and September, white, fragrant, with a reddish or purple inflated calyx, and produced in loose 3-forked branching cymes.

Culture &c. as above. This species is readily increased by means of root cuttings in bottom heat as mentioned above.

CARYOPTERIS.—A genus containing 4 or 5 species of erect, often very fragrant, smooth or downy shrubs or undershrubs, having opposite, entire, or toothed leaves. Flowers blue, violet, or red. Calyx bell-shaped deeply 5-cleft. Corolla tube short, cylindrical; limb large 5-cleft, 4 lobes being nearly equal oblong or obovate flat and spreading, the fifth lower one being longer, concave or hooded with a fringed or crisped margin. Stamens 4, didynamous, protruding. Ovary imperfectly 4-celled. Capsule shorter than the calyx, 4-valved.

C. Mastacanthus. — A pretty Chinese bush 2 ft. or more high with dull purplish stems and bluntly ovate-oblong coarsely toothed downy leaves 2–3 in. long, whitish beneath. Flowers in October, rich violet or lavender blue, borne in clusters at the tips of the shoots and in the axils of the upper leaves.

Culture and Propagation. — This species is more suitable for the mild southern parts of the country than for other localities. It thrives in rich loamy soil in warm sheltered positions, and requires abundance of water during the summer months. It may be increased by seeds sown in heat in spring; by cuttings of the young shoots in heat in spring; or by dividing the stools at the same season. In autumn or winter a good mulch of well-rotted manure around the plant will be very beneficial.

C. mongolica is another Chinese species with violet-blue flowers and elliptic lance-shaped grey-green leaves hoary beneath, which requires similar treatment.

LXXXIX. LABIATÆ—Lavender Order

A large order of herbs, undershrubs, or shrubs, very rarely arborescent or climbing, with opposite or verticillate and usually 4-angled branches. Leaves opposite or whorled, without stipules, entire, toothed, or variously dissected, often furnished with immersed glands of fragrant aromatic oil. Flowers hermaphrodite usually irregular, in the axils of the leaves or bracts, solitary or in pairs, or in clustered cymes forming false whorls by their union in pairs. Calyx inferior, persistent, gamopetalous, ribbed, 5-10-toothed or 2-lipped. Corolla gamopetalous, usually 2-lipped and 4-5-lobed. Perfect stamens 4, didynamous or rarely equal, or 2. Ovary superior 4-lobed or parted, seated in a fleshy disc. Fruit usually composed of 4 (rarely fewer) 1-seeded nutlets enclosed in the persistent calyx.

This order contains about 140 genera and 2600 species, and includes such well-known plants as Basil, Horehound, Sage, Lavender, Marjoram, Mint, Patchouly, Rosemary, Savory and Thyme. All the members of the order bear a striking resemblance to each other in having 4-angled stems, opposite or whorled leaves, and irregular 2-lipped flowers.

COLEUS.—A genus of herbs, bushes or shrubs mostly natives of the Tropics, and chiefly remarkable for their beautiful and brilliantly coloured leaves. The flowers are small and of little account, usually borne on terminal spikes or loose cymes. Calyx bell-shaped, 5-toothed or 2-lipped. Corolla with a slender tube and a 2-lipped limb; upper lip 3-4-lobed, the lower one entire, often concave and enclosing the 4 didynamous stamens.

C. Blumei.—A perennial species 12-18 in. high, native of Java. Leaves rhomboid-ovate deeply and coarsely serrate, taper-pointed, pale green, marbled or spotted with dark purple or red. Flowers small, purple and white, in long whorled spikes or racemes. *C. Verschaffelti* is a deep blood-red leaved variety.

Culture and Propagation.—From this species and its variety most of the garden Coleuses have been developed, and there are now a vast number of forms remarkable for the brilliant shades, colours, blotches, and variegations of the leaves. Most of them are too tender for open-air cultivation, the old *C. Verschaffelti* being still the best for outdoor gardens. They flourish in ordinary garden soil and are effective in the border from the end of May to October. Young plants are easily raised by means of cuttings in spring and summer. They root readily in moist sandy soil, those taken in early spring requiring a little bottom heat to make them root more quickly and to prevent them rotting.

New varieties can always be obtained by sowing seeds about February or March in moist heat about 70° Fahr. As soon as the seedlings have made a pair or two of leaves they must be pricked out either singly into small pots, or several 2-3 in. apart in pans, pots, or boxes, and grown on into various sized pots as the season advances.

LAVANDULA (LAVENDER).—This genus contains about 20 species of perennial herbs, bushes, or shrubs, having opposite, entire, or toothed leaves, those near the base clustered and sometimes pinnately dissected. Flowers blue or violet, small, on long-stalked spikes. Calyx ovoid, tubular, 13-15-ribbed, unequally 5-toothed. Corolla tube protruding, a little dilated at the throat, and having a 2-lobed upper and a 3-lobed lower lip. Stamens 4, didynamous.

L. vera (*L. Spica*).—*Common Lavender.*—A very variable shrubby species 2-3 ft. high, native of S. Europe. Leaves oblong lance-shaped, entire, hoary on both sides, and having somewhat revolute edges. Flowers in summer, blue, rarely white, on long erect spikes, 6-10 small flowers in a whorl.

The flower spikes of this species are cut and dried on account of their fragrant odour which lasts for a long time. When the flowers are fully open, the spikes may be cut and hung up to dry in a cool, dry, airy place. Lavender is extensively grown for its flowers near Mitcham in Surrey, and at Hitchin in Hertfordshire. The broad-leaved Lavender is supposed to be *L. Spica*, and the narrow-leaved Lavender *L. angustifolia*.

Culture and Propagation.—The common Lavender may be considered as hardy in most parts of the kingdom, although it is apt to be cut down to the ground by very severe frosts in bleak unsheltered localities. It is one of the oldest plants in British gardens and is met with in all kinds of places. It may be increased by cuttings of the shoots in August and September, inserted in free sandy soil under a handlight, and kept under cover until the following May, when they will be well rooted and fit for transplanting to the open ground.

There are several other species of Lavender, *L. Stœchas* with purple flowers being the best, but none is so popular as the common one.

PERILLA. — A genus with 1 or 2 species of annual herbs often with violet or blackish foliage, and small pedicellate flowers. Calyx bell-shaped, 10-nerved, 5-cleft, 2-lipped. Corolla obliquely bell-shaped, shortly 5-lobed. Stamens 4, almost equal.

P. nankinensis (*P. ocymoides crispa*). A beautiful tender Chinese annual 1–3 ft. high with broadly ovate, wrinkled, deeply crenate-serrate leaves 2–4 in. long and of a deep dark bronzy-purple colour. Flowers numerous, small, white, in racemes.

This plant is grown chiefly for the rich effects of its dark coloured foliage which is very showy in masses here and there in the border or on lawns. In using it with plants of other colours care should be taken to avoid incongruous mixtures. There is a form called *macrophylla crispa* with large, handsome, crisped foliage, superior to the ordinary variety.

Culture and Propagation.—This plant may be raised from seed sown in February or March in gentle heat and grown on for planting out in May like other tender annuals. By pinching out the tips of the shoots fine bushy plants may be obtained. Any ordinary garden soil will suit it. For treatment of annuals in general see p. 78.

MENTHA (Mint).—A genus of erect, spreading or dwarf perennials with opposite leaves and flowers in false whorls or 'verticillasters,' or spikes. Calyx bell-shaped, 5-toothed, or tubular, 10-nerved, equal or 2-lipped. Corolla 4-lobed, with a bell-shaped throat, stamens 4, styles 2, cleft at the apex. Nutlets ovoid smooth.

Culture and Propagation.—There are about 25 species of Mint, but only a few are useful for the flower garden. Most of the species exhale a more or less aromatic odour so well-known in the garden or Spear Mint (see p. 1164), Pennyroyal (*M. Pulegium*), and Peppermint (*M. piperita*).

The kinds mentioned below are chiefly valuable for borders and edgings and will grow in any garden soil. They are easily increased by dividing the shoots, which when they trail on the ground root at almost every joint.

M. gibraltarica. — This is really a variety of our native Pennyroyal (*M. Pulegium*). It grows only one or two inches high, and forms dense compact tufts of deep green roundish oval leaves on the surface of the soil. It is admirably adapted for borders and edgings, and is much used in carpet bedding. Being a native of S. Europe, the variety *gibraltarica* is not quite hardy in our climate, except in the mildest parts of the south and west. It may, however, be increased by wintering the rooted portions in cold frames in the unfavourable parts of the kingdom.

M. Requieni.—A pretty trailing perennial 2–4 in. high, native of Corsica. It has roundish leaves and pale purple flowers. It is, however, chiefly valuable for carpeting the soil beneath taller growing plants, and may be increased in the same way as *M. gibraltarica* above.

M. rotundifolia.—The variegated form of this British plant is much used for edgings, and for covering dry banks. It has much-wrinkled broadly ovate-oblong leaves, with crenate margins, shaggy above, woolly beneath, and elegantly mottled with green and yellowish-white.

Culture &c. as above.

ORIGANUM (Marjoram).—A genus containing about 25 species of bushes or perennial herbs with small entire or slightly toothed leaves, the floral ones all being reduced to bracts. Flowers clustered in globose, oblong, or cylindrical spikes, sometimes with large coloured bracts entirely hiding the calyx, and sometimes with herbaceous, rounded, imbricating or ovate lance-shaped bracts not longer than the calyx. Calyx ovoid bell-shaped, ribbed, 5-toothed or 2-lipped. Corolla 2-lipped, the upper lip erect spreading, emarginate or shortly 2-cleft, the lower lip longer, spreading 3-cleft. Stamens 4, sometimes protruding. Nutlets ovoid or oblong, smooth.

Culture and Propagation.—Only one or two species are worth a place in the garden, a warm, dry, and sheltered situation in the rockery or border suiting them best in any ordinary soil. They may be increased by seeds sown in cold frames, or by cuttings of the young flowerless shoots in spring inserted in sandy soil under handlights. The plants may also be divided in autumn. The cultivation of Marjoram is dealt with separately at p. 1168.

O. Dictamnus (*Cretan Dittany*).—A pretty little bush about 1 ft. high, native of Crete, with blunt and broadly ovate entire, thickish leaves covered with a dense wool on both sides. Flowers in summer, pink or purple, in drooping Hop-like heads.

Except in the mildest parts of the south of England and Ireland this species must be considered as tender, and requires glass protection in winter.

Culture &c. as above.

O. hybridum (*O. pulchellum*). — This ornamental species is or was usually grown under the name of *O. Tourneforti*, but is quite distinct from that smooth species, and may probably be a hybrid between *O. Dictamnus* and *O. sipyleum.* It grows 12–18 in. high, and has almost sessile, elliptic, hairy leaves ¾–1 in. long, arranged in opposite pairs crosswise on the hairy stems. Flowers in summer, pale purple or pink, borne on candelabra-like stems 8–12 in. high, and drooping in clusters, reminding one somewhat of the inflorescence of *Briza maxima*, the ovate imbricating bracts almost concealing the flowers, which have long slender tubes and protruding stamens. The true plant is figured in the 'Gardeners' Chronicle,' Feb. 1888, p. 233. It seems to be quite hardy at Kew in the rock garden.

Culture &c. as above.

THYMUS (Thyme). — A genus of dwarf shrubs or undershrubs having small entire leaves, those on the flower spikes being reduced to bracts. Calyx ovoid, 10–13-nerved, 2-lipped. Corolla tube enclosed in the calyx or protruding, limb 2-lipped. Stamens 4, usually protruding, Nutlets ovoid or oblong, smooth.

Culture and Propagation.—The only value possessed by the Thymes from a flower garden point of view is that they make excellent plants for carpeting the rockery in dry poor places where few other plants will thrive. Once they have taken a hold of the soil they soon spread and make dense small-leaved cushions which look very charming when studded with the clusters of small flowers. They may all be increased by dividing the plants in autumn, or by putting cuttings into prepared beds of fine sandy soil during the summer in shady places. Seeds may also be sown in cold frames in spring.

T. Chamædrys.—A British plant with wiry stems and oval elliptic leaves usually contracted rather abruptly into a stalk. Flowers in summer and autumn, pale purple. The variety *montanus* (*T. nummularius*) is a beautiful carpet plant with small light green leaves almost hidden in July with masses of white flowers.

Culture &c. as above.

T. Serpyllum (*Brotherwort; Wild Thyme*). — A British plant with trailing flat green quite entire ovate or obovate lance-shaped leaves, ⅛–¼ in. long, and rosy-purple flowers from June to August. The sweet-scented Lemon Thyme (often called *T. citriodorus*) is a variety with smaller leaves, and its golden-leaved form *aureus* makes an exquisite carpet and looks particularly handsome during the bleak winter months. The variety *lanuginosus* has the leaves and young shoots clothed with long woolly hairs.

Culture &c. as above.

The Common or Garden Thyme (*T. vulgaris*) is dealt with at p. 1165. Besides its value as a herb, it makes an excellent rock plant.

MICROMERIA. — A large genus of undershrubs or herbs, with opposite leaves, and usually small purple or white flowers, borne in axillary or spiked whorls, rarely in cymes or panicles.

M. Piperella.—This is the only species of any garden value. It is a native of S.W. Europe, and grows about 3 in. high, having ovate leaves, sometimes heart-shaped at the base. The flowers are produced in late summer, in clusters, and have both calyx and corolla downy outside.

Culture and Propagation. — This plant flourishes in ordinary good garden soil, and is appropriate for warm sunny corners of the rockery. It requires a little protection in winter, either by means of a small handlight or piece of glass, or a few bracken leaves during severe frosts.

It may be increased by cuttings of the half-ripened shoots inserted in sandy soil under a handlight during the summer months, and kept shaded until they are rooted. They may be planted out the following spring. Seeds, if obtainable, may also be sown as soon as ripe, in greenhouses or cold frames.

CALAMINTHA (CALAMINT). — A genus closely related to Thymus, and differing chiefly in having a tubular 2-lipped calyx, and a larger 2-lipped corolla, usually protruding from it. Stamens 4, didynamous. Leaves entire or often most of them toothed.

Culture and Propagation. — The plants belonging to this genus may be used in the same way as the Thymes. They flourish in ordinary garden soil, and may be utilised for carpeting purposes in the rockery or border. They are easily increased by division in early autumn or spring, or by means of seed sown when ripe in warm sheltered spots or in cold frames.

C. glabella.—A compact tufted herbaceous plant about 3 in. high, with linear lance-shaped sessile leaves and tubular scented purple flowers, borne in great abundance in summer.

Culture &c. as above. The rockery in sandy loam. Increased by division and seed.

C. grandiflora.—A South European species about 1 ft. high, with branched and decumbent stems. Leaves stalked, ovate, coarsely toothed, 2–3 in. long. Flowers in June, 1½ in. long, purplish, in loose racemes, much inflated at the throat.

Culture &c. as above. A useful rock plant in dry sunny places. May be increased like the Thymes.

MELISSA (BALM).—A genus containing 3 or 4 species of perennial herbs with toothed leaves, the upper ones gradually becoming smaller and bract-like. Flowers in loose axillary racemes or whorls. Calyx tubular, bell-shaped, 13-nerved, 2-lipped. Corolla 2-lipped, the upper lip emarginate, the lower one spreading, 3-cleft. Stamens 4, didynamous. Nutlets ovoid, smooth.

M. officinalis.—This is the Common Balm of Central and S. Europe, and now naturalised in the S. of England. It grows 2–4 ft. high, and has broadly ovate or heart-shaped, crenate or toothed leaves which emit a fragrant odour when bruised. Flowers from June to October, white or pale yellow. The variety with green and golden variegated foliage is very handsome and fragrant, and is often used for edging in the front of borders and shrubberies.

Culture and Propagation. — Balm flourishes in ordinary garden soil, and may be easily increased by dividing the tufts in spring. It is often used for medicinal drinks, and sometimes for cooking purposes.

HORMINUM.—A genus with only one species:—

H. pyrenaicum. — An elegant herbaceous perennial 6–12 in. high, native of the Pyrenees to the Tyrol, with dense tufts of radical stalked, bluntly ovate, deeply crenate leaves, the upper ones being reduced to bracts. Flowers in summer, bluish-purple, about 1 in. long on spikes about 9 in. high. Calyx bell-shaped, 2-lipped. Corolla 2-lipped, the lower lip with 3 short and broad rounded lobes, the middle one broader and emarginate. Stamens 4, didynamous.

Culture and Propagation. — This species is perfectly hardy, and flourishes in ordinary well-drained garden soil in the border. It is increased by dividing the crowns in spring or by seeds sown in the open border in warm spots when ripe or in spring, afterwards pricking out or transplanting the seedlings as required.

SALVIA (SAGE).—A genus containing about 450 species of herbs, bushes, or shrubs, with various habits, and entire toothed, incised or pinnately cut leaves, the upper ones on the stems often changed into bracts. Flowers of various colours, rarely yellow, mostly showy, sessile or shortly stalked, and borne in spikes, racemes, and panicles, rarely all axillary. Calyx ovoid, tubular, or bell-shaped, 2-lipped, the upper lip entire or 3-toothed, the lower one 2-cleft. Corolla 2-lipped, with an inflated or enlarged tube, naked, hairy, or tuberculate within; upper lip concave or arched, erect, entire, or emarginate; lower lip spreading, 3-cleft, the middle lobe usually broader, entire, emarginate, or 2-cleft. Perfect stamens 2, remarkable for having distant anther-cells, one sterile and the other fertile. Nutlets ovoid-triquetrous, or somewhat flattened, smooth.

Culture and Propagation. — Most of the Sages are easily grown in ordinary good garden soil, almost as easily indeed as the common Sage, *S. officinalis*, so much used for cooking purposes. The hardy varieties are increased by division in the autumn or early spring, or by seed sown at the latter period. Cuttings of the young ripened shoots may also be inserted in a shady border late in summer and autumn, in the case of the half shrubby kinds. The more tender kinds are raised from seeds sown in heat about February and March, and by the end of May or middle of June are fit for the open ground. Cuttings root readily in heat in spring, and produce plants for autumn or late summer flowering; but plants from seed are becoming more popular, chiefly because they produce specimens with a better shape and perhaps more blossom. However, according to circumstances Sages may be increased by seeds, cuttings, or division, as required. The following list, although not exhaustive, contains a description of the best flower garden varieties.

S. argentea (*S. patula*).—A distinct and handsome biennial about 3 ft. high, native of Southern Europe, with erect hairy stems, and tufts of large oval, wedge-shaped, sinuately lobed leaves 6–8 in. or more long, wrinkled and covered with silvery white, woolly hairs. Flowers in summer, white or pinkish-white, 6–10 false whorls forming a large branching panicle.

Culture and Propagation.—This is a fine plant for groups or masses in the border, owing to its masses of large silvery leaves carpeting the ground. The seeds may be sown in autumn, the young plants being wintered in a cold frame and planted out the following May or June. They may also be sown in heat in February and March. By pinching out the flower-spikes the foliage will retain its freshness and beautiful silvery sheen for a much longer period.

S. azurea (*S. acuminata*).—A smooth greyish green N. American species 3–6 ft. high, with stalked oval or linear lance-shaped leaves, the upper ones narrower, all entire or unequally toothed. Flowers in July and August, deep blue, in long clustered spikes. The variety *grandiflora* (also known as *S. Pitcheri*) has larger and deeper blue flowers than the type. There is also a white-flowered form.

Culture and Propagation.—Seeds of this may be sown in autumn or spring as in the case of *S. argentea*. It is easily increased also by dividing the tufts in spring, and by inserting cuttings at the same period in sandy soil under a hand-light or in the greenhouse.

S. bicolor.—A distinct and handsome biennial, native of Barbary, with thick stems 2–3 ft. high, and large ovate incised-toothed pinnately cut or palmately lobed leaves, becoming smaller up the stem. Flowers in summer, in racemes 1½–2 ft. long; upper lip bluish-violet, spotted with yellow; lower lip whitish.

Culture &c. as above. This may be increased from seeds in the same way as *S. argentea*.

S. Candelabrum.—A fragrant aromatic shrubby species 3–4 ft. high, with rather blunt lance-shaped oblong crenate leaves 3–4 in. long, loosely wrinkled hairy and dotted with oil-glands. Flowers in July, in long panicles, white, striped with pale purple, hairy outside; lower lip rich violet streaked with white in the throat. Calyx sharply ribbed, tinged with purple.

Culture and Propagation. — This species being a native of Mexico is not quite hardy in our climate. It is a fine border plant and may be increased by seeds sown in autumn, or in spring in gentle heat. Cuttings of the side or non-flowering shoots may also be inserted during the late summer months in cold frames, and when rooted the plants should be protected in a greenhouse until the following spring.

S. carduacea.—A distinct and pretty Californian perennial, with stout, simple stems, 1 ft. or more high, and tufts of oblong, pinnately cut and lobed, sinuate-toothed, spiny, Thistle-like leaves. Flowers in July and August, lavender-blue, about 1 in. long, the upper lip erose-toothed, or fringed, the lower one with a deeply many-cleft middle lobe, and fringed side lobes.

Culture and Propagation. — This is too tender in winter for any except the mildest parts of the south coast. It likes a rather dry soil, and warm sunny positions, and may be raised annually from seeds sown in heat in spring.

S. coccinea.—A native of Central and S. America about 2 ft. high, softly downy with oval heart-shaped unequally crenate leaves, usually softly downy beneath. Flowers in summer, deep scarlet, 1 in.

long, downy outside, in twiggy racemes. The variety *major* grows taller and has larger flowers than the type; *pseudo-coccinea* is usually recognised by its hairiness; and *punicea* (or *superba*) has more showy and velvety scarlet flowers; there is a dwarf strain of it.

Culture and Propagation.—Although a perennial this species may be treated as an annual, and raised from seeds sown in heat every February or March and planted out in May or June. Seeds may also be sown in autumn, protecting the plants under glass until planting out time. This entails a lot of work, without sufficient recompense in earliness of blossom.

S. farinacea. — A pretty Mexican perennial, about 3 ft. high, forming vigorous tufts of erect stems, having long-stalked, smooth, shining, oval, crenulate leaves. Flowers from August to October, violet-blue, in long interrupted spikes. Calyx pale violet, densely tomentose; lower lip of the corolla with an obcordate 2-lobed middle division, and a white throat.

Culture and Propagation. — This vigorous species is useful for groups, beds, borders &c., and although a perennial may be raised annually from seeds sown in heat about February and March, and planted out in May or June.

S. Greggi. — An ornamental Sage native of Texas to Mexico. It forms a large much-branched bush 3–4 ft. high and has rather small bluntly ovate entire leaves. The rosy-carmine or crimson flowers appear from August until cut down by the frost, and are borne at the ends of the shoots in long spikes. The individual flowers are medium in size, and remarkable for a very broad lip.

Culture and Propagation. — This species is almost perfectly hardy in the milder parts of the country, and is no doubt quite so in the most favourable parts of the kingdom. It flourishes in ordinary good garden soil, and is readily increased by seeds sown in gentle heat in spring, or in cold frames in autumn. Cuttings may also be inserted in sandy soil in summer and autumn.

S. hians.—A pretty hairy Himalayan perennial about 2 ft. high with broadly ovate leaves, heart-shaped sagittate or truncate at the base. Flowers in summer, beautiful blue, in slightly branched racemes.

Culture &c. as above. Raise from seed in early spring, and plant out in May or June.

S. Horminum (*S. colorata*).—A native of S. Europe about 1½ ft. high with erect hairy stems. Leaves oval oblong rounded or wedge-shaped at the base, blunt, crenate, hairy, the upper ones ovate heart-shaped. Flowers in summer, purple, in simple racemes. The variety *purpurea* has rosy-carmine or reddish-purple bracts with deeper coloured veins. There is also a variety with whitish bracts.

Culture and Propagation.—This is a good plant in groups and masses, the coloured bracts constituting the chief charm. It likes rich light soil and warm situations and may be raised from seed sown in heat in February or March, or in the open ground in April and May, the seedlings eventually being planted about 9 in. apart. Useful for cutting.

S. officinalis aurea.—This is a dwarf compact form of the common grey-leaved garden Sage, having yellow instead of blue flowers. It makes a handsome border plant. The variety *tricolor* is also handsome, having grey-green leaves often tinged with yellowish-white or flesh colour, afterwards changing to rose and sometimes red.

Culture &c. as above. Increased by seed, division, or cuttings.

S. patens (*S. spectabilis; S. macrantha*).—A beautiful tuberous-rooted Mexican perennial about 2½ ft. high with erect hairy stems. Leaves ovate deltoid crenate, hastate or rounded at the base, hairy. Flowers in autumn, deep blue, upwards of 2 in. long, in erect spikes. There is a variety *alba* with white flowers.

Culture and Propagation. — This species is not hardy enough to stand the winter as a rule, but its tuberous roots may be protected with litter &c., or lifted and kept in sand in dry airy places free from frost like Dahlia roots. Cuttings may be rooted in autumn and sheltered under glass until the following May or June. Seeds may also be sown in February and March in heat, the young plants being grown on as with other kinds.

S. ringens.—A shrubby species, 1–2 ft. high, native of Greece. Leaves stalked, hairy, irregularly and pinnately cut into unequal ovate oblong segments rounded at the base. Flowers in summer, reddish-purple, and 4 times longer than the striped calyx.

Culture &c. as above. Increased by seeds and cuttings.

S. rœmeriana (*S. porphyrantha; S. porphyrata*). — A native of Texas with stems 1–2 ft. high often sparingly hairy below. Lower leaves oval kidney-shaped, crenulate toothed, the upper ones less rounded, all downy. Flowers in July and August, deep scarlet, downy, 1 in. or more long, narrowly tubular funnel-shaped, somewhat arched, and borne in long loose racemes.

Culture &c. as above. Increased by seeds and cuttings.

S. Sclarea (*Clary*).—A biennial species native of S. Europe, 2–3 ft. high, with clammy hairy stems. Leaves often 8–9 in. long, ovate erose-crenate, heart-shaped at the base, wrinkled, hoary; the uppermost ones stem-clasping; those near the flowers being coloured, very broad concave and taper-pointed. Flowers in August, bluish-white, twice as long as the hairy bell-shaped calyx, and borne in panicled racemes.

Culture and Propagation. — This species flourishes in light stony soils and has a very ornamental and picturesque appearance when in bold masses. Seeds may be sown as soon as ripe in autumn in a cold frame, and the young plants placed in the open border at the end of May about 3 ft. apart. In warm mild situations as in the south of England and Ireland, it will come up from self-sown seeds.

S. splendens (*S. colorans*).—A brilliant Brazilian species 2–3 ft. high, with ovate tapering, crenate-serrate, smooth and bright green leaves, somewhat greyish beneath. Flowers in summer and autumn out of doors, brilliant scarlet, 2–2½ in. long, with a bell-shaped coloured calyx. There are a few forms perhaps dwarfer in habit, and more brilliant in colour if possible.

Culture and Propagation. — This species is usually grown in pots to make greenhouses and conservatories look cheerful in winter. It is easily raised from cuttings almost at any time during the spring and summer in greenhouses, and the earliness or lateness of the flowers depends on the time the plants were rooted. For outdoor purposes it is necessary to sow seed in heat about February and March. The seedlings are pricked out into small pots as early as possible and grown on in the same temperature until well established. They may then be put into larger sized pots and after a couple of weeks transferred to cooler and more airy quarters so as to be hardened for planting out at the end of May or some time in June, according to the mildness or otherwise of the season. They may be grown exactly in the same way for greenhouse decoration in pots. The soil they like best is a rich sandy loam with leaf mould. As a rule they flower profusely and make fine bushes without the aid of stimulants, but there is no harm in giving a little weak liquid manure to pot plants ocasionally. Out of doors the plants should be placed in bold groups or beds by themselves on grass in warm sunny situations where they will be sheltered from violent winds by the surrounding vegetation.

Other tender Sages that may be grown in the same ways as *S. splendens* are *S. cacaliæfolia* (deep blue), *S. elegans* (blood-red), *S. fulgens* (scarlet), *S. gesneræfolia* (scarlet), *S. Grahami* (purple-blue), *S, Heeri* (scarlet), *S. interrupta* (dark violet-purple), *S. involucrata Bethelli* (bright rosy-crimson), *S. rutilans* (bright scarlet) &c.

S. taraxacifolia. — A native of the Great Atlas Mountains with numerous ascending erect stems 6–18 in. high. Leaves 2–4 in. long, pinnately cut into blunt or cusped irregularly sinuate-toothed lobes, covered with whitish wool beneath. Flowers in July and August, pale pink, with a yellowish disc to the lower lip, and a hairy purple-spotted throat.

Culture &c. as above. Increased by seed and division in spring.

S. virgata. — A distinct European species 9–12 in. high with oblong ovate roughish leaves, and racemose spikes of deep blue flowers produced in great abundance in July and August. The beauty of the flowers is further enhanced by the deep purple-brown colour of the calyx.

Culture &c. as above. A good border plant in masses in ordinary soil. Increased by seeds and division in spring.

ROSMARINUS (Rosemary).—A genus with only one species:—

R. officinalis. — A popular old garden shrub, 2–4 ft. high, native of the Mediterranean region, and having stalkless, linear entire leaves, with revolute edges, and hoary beneath. Flowers in early spring, white or pale purple, in short axillary few-flowered racemes. Calyx purplish, ovoid bell-shaped, 2-lipped. Corolla 2-lipped, the upper lip erect emarginate or shortly 2-cleft, the lower one spreading 3-cleft, the middle lobe largest, concave bent down. Perfect stamens 2. Nutlets ovoid-roundish smooth.

Culture and Propagation.—The Rosemary grows well in ordinary well-drained garden soil, in rather dry, warm, sunny positions, and is chiefly valued on account of its fragrance. The foliage is used for making Rosemary Tea, and a plant is to be found in many cottage gardens. It may be increased by cuttings about 6 in. long, in summer, inserted in sandy soil in a shady border. If in a cold frame or under a handlight they will root more quickly, and be ready for transplanting by the end of September or sooner. The lower branches may also be bent down, and layered during the summer months. Seeds may also be sown in spring in cold frames or in the open border in warm sunny positions. There are three forms of the Rosemary—the common or green-leaved, the silver-striped, and the gold-striped; the last two are not quite so hardy as the common form, and should therefore be given more sheltered and favourable spots in the garden—such as against a south wall or hedge.

MONARDA (Horse Mint; Bee Balm).—A genus with 6 or 7 species of perennial herbs, often having leaves toothed and simple. Flowers in close heads or whorls at the ends of the branches. Calyx tubular, elongated, nearly equally 5-toothed. Corolla showy, scarlet, purple, white, pale, or in one species yellow, often spotted, long and slender, deeply 2-lipped; lips narrow, nearly equal and slightly toothed. Perfect stamens 2. Nutlets ovoid smooth.

Culture and Propagation. — The species are showy border flowers, and all natives of N. America, flourishing in ordinary garden soil, and in all positions except that of deep shade. They are increased by dividing the tufts or roots in autumn when growing in light rich soil, and in spring if in heavy and somewhat moist soil. Seeds may also be sown in the open border in April and May, or earlier in heat, for transplanting in May and June, about 18 in. apart. The plants are much frequented by bees even late in the afternoon, and this is no doubt the origin of one of the popular names.

M. didyma (*M. coccinea; M. kalmiana*).—*Oswego Tea.*—A square stemmed and grooved aromatic plant 1½–3 ft. high, with ovate lance-shaped pointed leaves, roundish heart-shaped at the base, and rather hairy on both surfaces. Flowers from July to September, bright scarlet, with pale green bracts tinted with red, in whorls or pairs. The variety *alba* with whorls of pure white flowers is a taller-growing plant with longer and narrower leaves.

Culture &c. as above. This plant and its variety flourish in damp marshy places as well as in ordinary soil.

M. fistulosa (*Wild Bergamot*). — A vigorous perennial 2–5 ft. high, having an aromatic scent, and downy oblong lance-shaped acute leaves, borne on hollow or solid stems. Flowers in summer, purple, mostly produced in single heads, and not so numerous as in *M. didyma.* Bracts tinted with purple.

This species is very variable and has received several names in consequence. The most distinct varieties are those with white, pale rose, violet, and purple flowers, but the names given to them are hopelessly mixed.

Culture &c. as above.

NEPETA (Cat Mint). — A genus of annual or perennial herbs sometimes tall and erect, sometimes spreading or trailing with incised or toothed leaves. Flowers axillary or terminal, often blue or white, rarely yellow. Calyx tubular 15-ribbed, usually incurved, unequally 5-toothed. Corolla 2-lipped, with a slender tube dilated and naked at the throat; upper lip often concave emarginate or 2-cleft; lower lip spreading 3-cleft, the middle lobe larger entire or crenulate or 2-cleft. Stamens 4, didynamous, ascending under the upper lip or rarely protruding. Nutlets ovoid or compressed, smooth.

Culture and Propagation.—About 120 species have been described, but they are mostly weeds. Those described below are the only ones at all worth a place in the garden. They are easily grown in any garden soil, and may be increased by dividing the plants in spring or by sowing seeds at the same period.

N. Glechoma (*Glechoma hederacea*). *Ground Ivy.*—The ordinary form is a British weed with stems trailing along the ground and rooting at the joints. Leaves kidney-shaped, crenate. Flowers blue, about 6 in axillary whorls. The variegated form is a distinctly pretty plant with silver-white and green variegated leaves. It is excellent for the rock garden trailing over the ledges of rock, but prefers rather shady moist positions, as the hot summer sun injures the foliage somewhat. It is readily increased by cutting the stems up at almost every joint and inserting them in a cool place in moist sandy soil.

N. Mussini. — A rather straggling Caucasian species 12–18 in. high, with sessile ovate-oblong toothed and wrinkled leaves about 1 in. long, hoary beneath. Flowers in June and July, pale purple or blue, in great profusion and resembling a mass of lavender bloom in the distance.

Culture &c. as above. This cannot be called a choice perennial. It grows in ordinary soil and may be increased by division of the roots.

N. spicata.—A native of the Himalayas 6–12 in. high. Leaves 1-4 in. long, broadly ovate heart-shaped, deeply toothed. Flowers in September, purple with an almost white lip, borne in spikes 2–4 in. long.

Culture &c. as above. May be grown like *N. Mussini.*

DRACOCEPHALUM (Dragon's Head).—A genus containing about 30 species of annual or perennial herbs with entire toothed or somewhat palmate-pinnatifid leaves. Flowers in spiked or capitate bracteate whorls, blue or purple, rarely whitish. Calyx tubular 15-ribbed, straight or rarely incurved, 5-toothed. Corolla 2-lipped with a slender tube dilated at the throat; upper lip somewhat concave emarginate; lower lip spreading, 3-lobed, middle lobe largest, rather 2-cleft. Stamens 4, didynamous, anthers diverging. Nutlets ovoid, smooth.

Culture and Propagation. — The species described below are more or less beautiful border flowers which flourish in any light rich garden soil in not too hot and sunny situations. They may be increased by division of the tufts in spring, or by cuttings of the young shoots in April and May inserted in sandy soil in cold frames or under handlights. The perennials may also be raised from seed sown under glass in spring, and all the annual varieties must of course be raised in this way.

D. argunense. — A perennial about 1½ ft. high, native of Dahuria, having linear lance-shaped, quite entire, smooth and almost stalkless leaves 2–3 in. long. Flowers from July to September, blue, downy, in whorled spikes.

Culture &c. as above. A good border plant in light warm soils. Increased by seed or division like *D. grandiflorum*, to which it is closely related.

D. austriacum. — A pretty perennial 1–1½ ft. high, native of the mountain ranges of Central Europe. Leaves divided into linear segments having revolute margins. Flowers in summer, blue, over 1½ in. long, in somewhat interrupted whorled spikes.

Culture &c. as above.

D. canescens (*Lallemantia canescens*). A pretty softly downy and whitish-looking annual or biennial species 12–18 in. high, native of E. Europe, Asia Minor &c. Lower leaves narrow, lance-shaped, long-stalked, entire or slightly toothed towards the apex; the floral leaves spoon-shaped or rounded bristle-pointed. Flowers in July and August, lilac-blue, in spikes 6–9 in. long, with oblong ciliated bracts, and a downy striped calyx.

Culture and Propagation. — This species is best raised from seeds sown under glass early in spring, and planted out in May or June; or seeds may be sown in the open border in April and May, afterwards thinning them out to 6 or 8 inches apart. It likes light sandy soil.

D. grandiflorum (*D. altaiense*). — A pretty Siberian perennial 6–9 in. high with oblong oval-lance-shaped crenulate leaves with long stalks. Flowers from June to September, blue, nearly 2 in. long, in oblong spikes 2–3 in. long, in great profusion, the lower lip dotted.

Culture &c. as above. This is suitable for rockeries, beds, or the front of shrubberies and borders in good sandy loam. It likes plenty of moisture in summer but should be protected from cold rains in winter. Slugs are very fond of the young growths and should be watched for in spring. Increased by seed and careful division.

D. imberbe. — A Siberian perennial about 6 in. high, with tufts of long-stalked heart-shaped reniform leaves having crenate-toothed margins. Flowers in summer, lilac-blue, borne in whorls.

Culture &c. as above.

D. Moldavicum.—A strong but rather agreeable smelling annual species 1–1½ ft. high, native of E. Siberia, with lance-shaped crenulate leaves. Flowers in July and August, blue, in long nodding racemes. There is a variety having white flowers.

Culture &c. as above. Raised from seeds sown every spring under glass and transplanted, or in the open border in light soil, and thinned out.

D. parviflorum.—A decumbent Siberian perennial having short-stalked lance-shaped toothed leaves about 1 in. long, smooth above, and somewhat hoary beneath. Flowers in summer, blue, 1–1½ in. long, or spikes 12–18 in. long.

Culture &c. as above. Suitable for parts of the rockery or border in light well-drained soil. Increased by seed and division in spring.

D. Ruprechti. — A compact-growing perennial 6–18 in. high, native of Turkestan, having ovate lance-shaped variously cut and toothed leaves. Flowers in summer, rosy-purple or lilac, about 1 in. long, in axillary clusters.

Culture &c. as above. Similar treatment to *D. parviflorum*.

D. ruyschianum.—A handsome perennial 12–18 in. high, native of the Alps and Pyrenees, having numerous erect downy stems and smooth linear lance-shaped entire leaves 1–1½ in. long, with revolute edges. Flowers in early summer, purplish-blue, about 1 in. long, and about 6 at the top of each stem.

The Japanese form of this species known as *japonicum* is a much finer plant than the type. It has beautiful violet-blue flowers with a broad white lip edged and dotted with violet. They appear from June to August, and if not allowed to produce seeds will continue until September and October. It may be increased in the same way as the typical *D. ruyschianum.*

Culture and Propagation. — This pretty species looks effective in the rockery or border, and prefers warm light soil in partially shaded situations. It may be increased by dividing the clumps in spring, and also by sowing seeds in light rich soil in April and May, afterwards transplanting when well established, or thinning out, and allowing the remaining plants to flower where sown. These may, if necessary, be transplanted to other parts the following spring.

D. speciosum.—A beautiful Himalayan perennial about 18 in. high, with long-stalked, broadly heart-shaped, wrinkled, green leaves, downy beneath. Flowers in June, pinkish-blue or lilac, with darker coloured spots on the lip and crowded into dense oblong spikes 1–4 in. long.

Culture &c. as above. Suitable for the border or rockery in light well-drained soil, and warm sheltered positions.

CEDRONELLA. — A genus closely related to *Dracocephalum*, and containing a few species of herbs or shrubs with toothed or 3-parted leaves. Calyx tubular or bell-shaped, 13–15-nerved, equally 5-toothed. Corolla 2-lipped. Stamens 4, didynamous, with anther cells parallel instead of diverging as in *Dracocephalum.*

Culture and Propagation. — These plants flourish in ordinary good and well-drained garden soil, but prefer a rich sandy loam to which some peat and leaf mould has been added. Most of the species may be easily increased by dividing the roots in early autumn, or in spring as growth is about to commence. Cuttings of the non-flowering shoots will also root in sandy soil under a handlight, or in a cold frame in spring and early summer.

C. cana.—A pretty hoary evergreen fragrant species 2–3 ft. high, native of New Mexico, having ovate-oblong toothed leaves. Flowers in July, bright purple or crimson, in numerous spikes.

Culture &c. as above. This species flourishes in rich sandy loam and peat, with a little leaf soil. It may be increased by cuttings of the young wood in spring and early summer under handlights, or by dividing the roots in spring. Not hardy in bleak exposed situations in severe winters.

C. cordata (*Dracocephalum cordatum*).—A native of the North United States 4–6 in. high, with trailing shoots, and almost stalkless ovate heart-shaped crenate leaves. Flowers in May and June, light purple, in bracteate spikes.

Culture &c. as above. This species is suitable for the rock garden or edges of borders, and shrubbery, in sandy loam and peat. Increased by division and cuttings like *C. cana.*

C. mexicana (*Gardoquia betonicæfolia*).—A Mexican shrub 2–3 ft. high with broadly ovate lance-shaped, toothed leaves, and many-flowered whorls of purplish blossoms borne in July on interrupted spikes or racemes at the ends of the shoots.

Culture &c. as above. Requires similar treatment to *C. triphylla.*

C. triphylla (*Dracocephalum canariense*). — *Balm of Gilead.* — A distinct shrubby perennial 3–4 ft. high, native of the Canary Islands. Leaves tri-sected into oblong lance-shaped segments, and emitting a fragrant odour when gently bruised. Flowers in summer, white or pale purple, in loose whorls on roundish-oblong spikes.

Culture and Propagation. — This species, which is better known than the others, is not quite hardy in this country and requires to be grown in warm sheltered situations facing south in sandy loam, peat and leaf soil. It may be increased by cuttings of the young shoots in spring, and is also easily raised from seed sown at the same period under glass.

SCUTELLARIA (Helmet Flower; Skull Cap).—A genus of hardy annual or perennial herbs or undershrubs, decumbent or spreading, rarely erect and tall, with leaves often toothed, sometimes pinnately cut or quite entire. Flowers axillary, solitary or in pairs, or in terminal spikes and racemes. Calyx bell-shaped, 2-lipped; lips entire, ultimately enclosing the fruits, the upper lip furnished with a helmet-shaped appendage which enlarges as the fruit is becoming ripe. Corolla 2-lipped with a long tube dilated at the throat; upper lip erect, helmet-shaped entire or emarginate, the lower lip spreading or deflexed broadly convex, the side-lobes free and spreading, often united with the upper lip, rarely with the lower. Stamens 4, didynamous, the anthers united in pairs. Nutlets roundish or depressed, tubercular hairy, rarely smooth.

There are about 90 species belonging to this genus, but only a few are fit for the outdoor garden, although several, of which *S. mociniana* is probably the best, are grown in greenhouses.

Culture and Propagation. — The hardy kinds may be increased by division of the roots or tufts in spring, but perhaps more readily by seeds sown in gentle heat in February or March, or in the open border in April and May in half-shaded positions in light sandy soil. The plants are useful for the flower border in masses or in parts of the rockery.

S. alpina. — A vigorous spreading Central European species with procumbent stems often rooting at the lower joints. Leaves shortly stalked, broadly ovate acutish, somewhat crenate-toothed, downy or hairy, the upper ones coloured and imbricated. Flowers in August, 1–1½ in. long, purple, with the tube or lower lip yellow, on oblong tetragonal spikes. The variety *lupulina* has wholly yellow flowers, while *bicolor* has the upper lip purple and the lower one white.

Culture &c. as above. *S. alpina* and its varieties may be used in the rock garden or the fronts of borders forming elegant tufts or carpets of foliage. Easily increased by dividing the rooted stems in spring, or by seed.

S. japonica. — A trailing Japanese perennial, the branches ascending at the ends. Leaves stalked, bluntly ovate, deeply crenate, smooth, about 1½ in. long at the base but gradually becoming shorter upwards. Flowers in summer, blue, downy, opposite, in loose racemes about 6 in. long.

Culture &c. as above. Requires similar treatment to *S. alpina.*

S. macrantha.—An excellent Siberian perennial with smoothish purplish stems procumbent at the base, but ascending at the tips, usually less than 1 ft. high and forming dense bushy tufts. Leaves stalkless, bluntly lance-shaped, entire, ciliated. Flowers in August, blue, about 1 in. long, in many simple racemes; corolla-tube much dilated upwards and having an incurved hood.

Culture &c. as above. Increased by

division and seed. A fine border plant, also known as *S. baicalensis*.

PRUNELLA or BRUNELLA (SELF HEAL). — A small genus of decumbent or somewhat erect - growing perennials with entire, incised - toothed, or pinnately cut leaves, those on the flower stems being reduced to bracts. Flowers purple, blue, or white, in dense terminal spikes. Calyx tubular, bell-shaped, 2-lipped, irregularly 10-nerved. Corolla 2-lipped, with a broad tube, the upper lip erect helmet-shaped entire, the lower one 3-lobed, the 2 side-lobes being deflexed. Stamens 4, two long and two short.

P. **grandiflora.** — A pretty European perennial about 6 in. high, somewhat resembling our common British Self Heal (*P. vulgaris*) in appearance. It has stalked ovate, toothed or entire leaves, and produces its erect trusses of violet or purple flowers in July and August. The variety *alba* has pure white flowers, but otherwise resembles the type. The variety *laciniata* has deeply cut leaves and deep purple flowers, and *webbiana*, which grows about 9 in. high, has dense clusters of crimson-purple blossoms, the sub-variety *major* having richer violet-purple ones.

Culture and Propagation. — These plants flourish in ordinary garden soil, which however should be in a well-drained condition, as too much moisture at the root in winter is very injurious to them. They may be grown in the rock garden or border in damp and partially shaded places, and look effective in bold masses. They are readily increased by division in early autumn or in spring, and also by seeds sown when ripe in cold frames.

PHYSOSTEGIA (FALSE DRAGON HEAD). — A genus containing 8 species of pretty, tall, erect-growing smooth or slightly downy perennials with serrate leaves. Calyx tubular bell - shaped, obscurely 10-nerved, nearly equally 5-toothed, increasing in size and becoming inflated as the fruit ripens. Corolla 2-lipped, much dilated beyond the middle, the upper lip sub-erect and rather concave entire or emarginate; the lower lip spreading 3-lobed. Stamens 4, didynamous, enclosed by the upper lip; anthers approaching in pairs. Nutlets sharply three - angled, rounded at the apex, smooth.

Culture and Propagation. — Physostegias flourish in a rich light soil and are useful plants for the flower border. During hot dry summers it is necessary to give them a good soaking with water occasionally, otherwise the leaves are apt to drop or turn yellow and the flower spikes do not attain their full beauty.

They are usually increased by dividing the rootstocks in spring and replanting them 12–18 in. apart. Seeds may also be sown in the open and somewhat shady border in April and May, and the seedlings may be transplanted in September or the following spring. Owing to their creeping underground rootstocks they soon spread and require disturbing almost every year.

P. **imbricata** (*Dracocephalum speciosum*).—A tall and handsome perennial 3–6 ft. high, native of Texas, with bright green 4-angled stems, and narrow sessile lance-shaped coarsely and irregularly toothed deep green leaves 3–5 in. long, becoming smaller up the stem. Flowers from July to September in dense axillary and terminal spikes, soft pinkish-purple, inflated and gaping, the middle lobe of the lower being dotted with purple. Botanically this is supposed to be a variety of *P. virginiana* and is sometimes called *P. v. speciosa*.

Culture &c. as above.

P. **virginiana** (*Dracocephalum virginianum; D. variegatum*).—A very variable species 1–4 ft. high, with thickish lance-shaped or oblong ovate acute sharply and irregularly toothed bright green leaves. Flowers from July to September, tubular, pinky - purple, about 1 in. long, in simple or branched racemes at the ends of the branches. The variety *denticulatum* (also known as *Dracocephalum denticulatum*) is recognised by its dwarf stature, rarely exceeding 12–18 in. high; it has obovate lance-shaped, crenulate, denticulate or obscurely serrated leaves, and loose slender spikes of rosy-purple flowers, the lower lip being spotted with red. There is also a white-flowered variety *album*, dwarfer in habit than the type.

Culture &c. as above.

MELITTIS (BASTARD BALM). — A genus with only one species:—

M. **Melissophyllum.** — A beautiful native perennial with long creeping rootstocks and more or less hairy erect simple or branched stems 1–2 ft. high. Leaves more or less shortly stalked, ovate or oblong crenate-serrate, hairy on the nerves beneath, 1½–2 in. long. Flowers in May and June, 2-lipped, 1–1½ in. long, creamy white, spotted with pink or purple; whorls axillary, 2–6-flowered. Calyx broadly bell-shaped; upper lip roundish, irregularly 3-lobed; lower lip with 2 rounded lobes. Stamens 4, didynamous. Nutlets ovoid smooth. The variety *grandiflora* is distinguished by its cream-coloured flowers with a purple-red middle lobe to the lower lip. There is also a rare variety with pure white flowers.

Culture and Propagation.—This species flourishes in ordinary garden soil, especially in rich well-manured loam, in partially shaded places near woods, walks, margins of shrubberies &c. It is increased by dividing the rootstocks early in autumn, and by sowing seeds in the open ground about April and May.

STACHYS (Hedge Nettle; Wound Wort). — A genus of tall perennial or diffuse annual herbs, rarely bushes or undershrubs, with entire or toothed leaves and sessile or shortly stalked flowers in terminal racemes or spikes. Calyx tubular-bell-shaped, 5- or 10-ribbed, more or less equally 5-toothed. Corolla 2-lipped with a cylindrical, straight, or incurved tube scarcely dilated at the throat and sometimes having a ring of hairs inside; upper lip erect, often concave or arched entire or slightly emarginate; the lower lip spreading 3-lobed, the middle lobe larger and broader entire emarginate or divaricately 2-cleft. Stamens 4, didynamous, the lower pair longer and sometimes protruding. Nutlets ovoid or oblong, blunt.

Culture and Propagation. — About 200 species have been described in this genus, but only those mentioned below are of any value for the hardy flower garden, although several others are likely to be found as a matter of course in botanical collections. They are of the easiest culture in ordinary garden soil and are readily increased by dividing the tufts or crowns in autumn or spring. Seeds may also be sown in spring in cold frames or in the open border about April and May, and again as soon as ripe in autumn. The seedlings may be transferred to their permanent positions in autumn or spring when large enough.

S. coccinea.—A pretty bushy species 1–2 ft. high, found wild from Texas to Arizona and Mexico. Leaves ovate lance-shaped or oblong deltoid, crenate, 1–2 in. long, the upper ones slenderly stalked, the floral ones sessile. Flowers in summer, scarlet, in long interrupted spikes.

Culture &c. as above. This brilliant species has been grown in greenhouses, but in warm sheltered and partially shaded spots it succeeds as a border plant. Increased by seed and division.

S. germanica.—A shaggy British and European biennial, 1–3 ft. high, clothed with white silky hairs, and having tufts of coarsely crenate-serrate, often heart-shaped, wrinkled leaves, 2–5 in. long. Flowers in July and August, pale rosy-purple, with a spotted lower lip, in dense whorls on stout spikes.

Culture &c. as above. This interesting plant is worthy of a place in dry, light soils in the rougher parts of the garden. Seeds may be sown as soon as ripe, so as to produce flowering plants the following season.

S. grandiflora (*Betonica grandiflora*). A downy perennial about 1 ft. high, native of the Caucasus and Siberia, with stalked, broadly and bluntly ovate, crenate, wrinkled, and hairy leaves. Flowers from May to July, beautiful reddish-violet, in many-flowered whorls, on erect spikes, produced well above the foliage. There is a variety called *rosea*, having soft rosy flowers.

Culture &c. as above. Useful for rougher parts of the garden or rockery, in open sunny situations. Easily increased by dividing the crowns every second or third year in autumn or spring, and replanting 12–18 in. apart.

S. lanata.—A distinct perennial 12–18 in. high, native of Tauria and the Caucasus, and having tufts of thick, wrinkled, oblong-elliptic leaves, densely covered with silvery-white, woolly hairs. Flowers in July, purple, small, in many-flowered, whorled spikes.

Culture and Propagation. — The foliage is really the only ornamental part of this species, and it retains its beautiful silvery sheen during the greater portion of the year. It makes an excellent and effective edging plant, and looks all the better for having the flower-stems pinched out. It grows so vigorously that it is almost necessary to divide the tufts every year, either in the early autumn or in spring. It may also be increased by sowing seeds in the open border in April and May, and transplanting the seedlings in autumn. But it is scarcely necessary to go to this trouble, as increase by division is so easy.

S. maweana.—A rare species 1 ft. or more high, native of Morocco, the whole plant being covered with silvery-white hairs. Leaves ovate, heart-shaped, deeply crenate-toothed, grey-green above, about 1 in. long. Flowers in July and August, pale straw-yellow, with purple blotches on the lower lip.

Culture &c. as above. This species thrives in warm sheltered borders in rich soil, and may be increased by seeds and division. The plant is figured in the 'Botanical Magazine,' t. 6389.

LAMIUM (Dead Nettle).—A genus of annual or perennial hairy herbs, decumbent at the base, often with heart-shaped, toothed, or somewhat incised leaves, and flowers in axillary or terminal bracteate whorls. Calyx tubular campanulate, 5-toothed. Corolla tube with or without a ring of hairs within the dilated throat; upper lip erect, ovate or oblong, concave or arched, entire, or rarely 2-cleft; lower lip spreading, 3-lobed. Stamens 4, didynamous; anthers cohering in pairs. Nutlets triquetrous, smooth or minutely tuberculate.

There are only a few species of any pretensions to garden value. The white (*L. album*) and purple (*L. purpureum*) Dead Nettles of the roadsides and ditches are probably the best known representatives of the genus, but are only weeds at the best. *L. Galeobdolon*, known as 'Yellow Archangel,' is a yellow-flowered perennial, of which there is also a variety with golden-bronzy leaves, that make it useful for rockeries or rough borders. *L. garganicum*, from Italy, grows 12–18 in. high, and has heart-shaped, wrinkled leaves, and dense whorls of purplish flowers. *L. maculatum* is now found naturalised in many parts of the British Islands, and is recognised by its heart-shaped, crenate, wrinkled leaves, having an irregular, silvery-white band down the centre. The flowers of the type are purple, but there is also a pretty white-flowered form, as well as one called *aureum*, with golden-coloured leaves. It is a pretty plant for rockeries and edgings to borders &c.

L. Orvala is a distinct Dead Nettle 1–3 ft. high, native of S. Europe, with large, broadly ovate, coarsely toothed leaves, and whorls of deep red flowers in early summer.

Culture and Propagation. — Any ordinary light and fairly moist soil will suit the Dead Nettles, which are easily increased by seed or division in spring.

MOLUCELLA.—A small genus of smooth, annual herbs, with stalked, crenate or incised leaves, and flowers in axillary whorls, having awl-shaped, sharp spiny bracteoles. Calyx obliquely bell-shaped, striped, 5–10-ribbed, and much dilated above into a broad, net-veined limb, enclosing the small 2-lipped, arching corolla. Stamens 4, didynamous. Nutlets acutely triquetrous.

M. lævis.—A singular Syrian species, 12–18 inches high, with long-stalked, roundish, coarsely toothed leaves. Flowers in August, in dense, erect, columnar, whorled spikes, having large, obscurely pentagonal, bell-shaped and net-veined calyces enclosing the white corollas.

Culture and Propagation. — This remarkable but not particularly showy plant may be treated as a tender annual. It flourishes in sandy loam, and may be raised from seeds sown in heat in February and March, the seedlings being transplanted in May to the rockery or border.

LEONOTIS (Lion's Ear).—A genus containing about 12 species of perennial herbs or shrubs with toothed leaves and flowers in crowded whorls. Calyx tubular, 10-ribbed, often incurved at the apex and with an oblique 8–10 more or less spiny-toothed mouth. Corolla tube cylindrical or dilated above with or without a ring of hairs inside; limb 2-lipped; upper lip erect, elongated, concave; lower lip short, spreading, 3-lobed. Stamens 4, didynamous, the lower pair longest. Nutlets ovoid, triquetrous, blunt or truncate at the apex, smooth.

L. Leonurus (*Phlomis Leonurus*).—A handsome S. African evergreen shrub 3–6 ft. high with woolly branches and oblong lance-shaped bluntly toothed leaves, downy above, woolly beneath. Flowers in summer, bright orange-scarlet, hairy, 2 in. long, and borne in 4–6 more or less distant whorls on a spike.

Culture and Propagation.—This remarkable plant, unfortunately, is, as a rule, too tender for British winters, but may be grown out of doors in southern parts of the country during the summer months, where it is more likely to flower than in more northern parts. It flourishes in a rich sandy loam, and may be increased by cuttings of the young shoots which root freely in spring if placed in gentle bottom heat. If the plants will not flower in the open air, they will be worth potting and placing in the greenhouse where they are likely to bloom about Christmas time.

PHLOMIS. — A genus containing about 50 species of woolly, hoary, or greenish perennial herbs, shrubs, or undershrubs with wrinkled leaves, becoming very small up the stems. Flowers sessile, yellow, purple, or white, with a woolly or hairy hood, and borne in dense whorls. Calyx more or less tubular, bell-shaped, 5–10-ribbed, often plaited, truncate or equally 5-toothed. Corolla 2-lipped with a ring of hairs inside the tube; upper lip broadly hooded, concave; the lower lip spreading, 3-cleft. Stamens 4, didynamous, the lower ones longest, anthers united in pairs. Nutlets ovoid-triquetrous, smooth, or downy at the apex.

Culture and Propagation.—All the *Phlomises* flourish in ordinary garden soil. They are among the most showy plants of the *Labiate* order and are well suited for naturalising in shrubberies or borders in warm and exposed situations. They may all be increased by seeds sown under glass or in the open border in spring, transplanting the seedlings later on 12–18 in. apart. The herbaceous kinds may also be increased by dividing the crowns in autumn or in spring, and the shrubby ones by cuttings of the young shoots, which root readily in sandy soil in cold frames in spring and early summer.

Besides those described below other species occasionally seen are *armeniaca* and *lychnitis*, yellow; *pungens*, purple-violet; *Samia*, greenish-white outside, pink within; and *tuberosa*, purple-rose.

P. cashmeriana. — A native of N. India, about 2 ft. high, having densely floccose-woolly stems and blunt ovate lance-shaped leaves, crenate towards the apex, broadly rounded at the base, downy or hairy above, woolly white beneath. Flowers in summer, pale lilac-purple, with awl-shaped ciliated bracts.

Culture &c. as above. Increased by division or seed.

P. ferruginea. — A shrubby S. European species 2–3 ft. high, having the branches covered with loose rusty-purple wool. Leaves 2–3 in. long, bluntly oblong lance-shaped, crenulate, much wrinkled, and green above, woolly white beneath. Flowers in June and July, yellow, downy outside, 12–20 in a whorl.

Culture &c. as above. Increased by seeds and cuttings.

P. fruticosa (*Jerusalem Sage*).—A distinct shrub 2–4 ft. high, native of the Mediterranean region. Leaves ovate or oblong, roundly crenate at the base, wrinkled and green above, woolly white beneath. Flowers in June and July, yellow, showy, 20–30 in a whorl; whorls solitary or in pairs at the top of the stem.

Culture &c. as above. Increased by cuttings and seeds.

P. herba-venti.—A handsome spreading S. European perennial 1–2 ft. high with green or purplish hairy stems. Leaves 6–8 in. long, leathery, oblong lance-shaped, crenate, shining green and rough above, greyish beneath. Flowers in summer and autumn, purplish-violet, downy outside, 10–20 in a whorl. Calyx hairy with stiffish, awl-shaped, spreading teeth.

Culture &c. as above. Increased by division and seed. Known as 'Wind Herb.'

P. viscosa (*P. linearifolia russelliana*). — A vigorous Syrian perennial 3–5 ft. high, with simple whitish downy stems. Lower leaves 6–8 in. long, stalked heart-shaped ovate, toothed, green and wrinkled above, grey beneath, the upper ones opposite and crosswise in pairs. Flowers in summer, 30–50 in a whorl, with narrow prickly pointed bracts.

Culture &c. as above. Increased by division and seed.

EREMOSTACHYS. — A genus of erect slightly branched perennial herbs, with large coarsely toothed, incised, pinnately cut or dissected leaves springing from the root, those of the stem smaller and often bract-like. Flowers sessile, in dense whorls, distant or clustered on the spike. Calyx large, tubular, bell-shaped or dilated above into a very large membranous limb, 5–10-ribbed, and having 5 equal needle-like or stiff pointed teeth. Corolla 2-lipped with or without a ring of hairs inside the tube, upper lip oblong erect hooded, narrowed at the base, bearded inside and on the margins, lower lip spreading with 3 rounded lobes. Stamens 4, didynamous. Nutlets obovoid triquetrous.

E. laciniata (*Phlomis laciniata*).—A graceful and distinct looking perennial 1–2½ ft. high, with tufts of leaves, 6 in. or more long, pinnately cut into oblong lance-shaped or linear, deeply jagged segments, the upper stem leaves similar but becoming gradually smaller upwards. Flowers from June to August, rosy-purple, with a hairy yellow-hooded upper lip, whorls 10–20-flowered, 8–12 on an erect spike. The plant known as *iberica* is probably only a variety with less hairy leaves and yellow flowers, and seems to be identical with a variety called *flava*.

Culture and Propagation.—As many as 27 species have been described by botanists, but that described above seems to be the only one in cultivation. It flourishes in a light rich soil in warm sheltered positions, and produces a good effect on lawns or in large groups or beds, but the plants are rarely seen to perfection. They may be increased by division in autumn or spring, but better plants are probably obtained from seed. The latter should be sown under glass in spring in light rich soil, and the young seedlings pricked out and grown on in frames until the following spring, when they may be transplanted to the open border or bed 18–24 in. apart.

TEUCRIUM (GERMANDER). — A genus of perennial herbs, shrubs, or undershrubs, of variable habit, having entire toothed or incised and sometimes much cut leaves, the upper ones often reduced to bracts. Whorls usually 2-flowered, axillary or in spiked racemes or terminal heads. Calyx tubular or bell-shaped, rarely inflated, 10-nerved with 5 more or less equal teeth. Corolla limb somewhat 2-lipped, obliquely 5-lobed, the 2 upper lobes very small, the 2 side ones larger, and the lower one largest. Stamens 4, didynamous, the 2 lower ones longest and protruding. Nutlets obovoid, reticulate, wrinkled.

Culture and Propagation.—Out of the 100 species or so which have been recorded those described below are among the best for the hardy flower garden. They all flourish in ordinary good garden soil. The herbaceous kinds may be increased by seed and division, and the shrubby ones by cuttings of the young non-flowering shoots inserted in sandy soil in cold frames in spring or summer in the same way as the *Phlomises* (p. 757).

T. Chamædrys (*Wild Germander*).—A compact stiffly hairy European and British perennial 6–10 in. high, with ovate or oblong deeply toothed leaves usually shining green, sometimes hairy. Flowers from July to September, rosy-purple, ¾ in. long, the lower lip spotted with white and red.

Culture &c. as above. Useful for borders, rockeries, ruins, old walls &c. in light soil. Increased by seed and division.

T. hircanicum. — A downy Persian perennial 1–2 ft. high, having stalked, bluntly ovate-heart-shaped, deeply crenate leaves 1–3 in. long, slightly downy above, and somewhat hoary beneath. Flowers in September, reddish-purple, hairy outside, on short erect hairy pedicels; spikes dense, 3–8 in. long.

Culture &c. as above. Increased by seeds and division.

T. Marum (*Cat Thyme*). — A dwarf greyish shrub about 1 ft. high, native of S. Europe. Leaves shortly stalked, entire oval or lance-shaped, downy above, whitish woolly beneath. Flowers in summer, bright reddish-purple, in pairs in the axils of the upper leaves, forming an oblong rather crowded spike at the ends of the branches.

Culture and Propagation. — This species grows best in the warm southern parts of the country in poor brick-rubbishy soil, and is useful for old walls, ruins &c. As cats have a peculiar affection for this plant its presence in the garden must be looked upon as an encouragement to these wanton plant destroyers. Increased by cuttings.

T. orientale. — A downy or hoary perennial about 1 ft. high, native of the Levant, leaves 1½–2 in. long, broadly ovate in outline, once or twice pinnately cut into linear, entire, or incised segments. Flowers in July and August, blue, in loose stiffly hairy panicles.

Culture &c. as above.

T. Polium. — A curious herb 3–5 in. high, native of South Europe. Leaves narrow, notched, densely covered with soft white or yellowish down, as are also the stems and branches. Flowers in summer, small, pale yellow, whitish or purple in small rounded heads at the tops of the branches.

Culture &c. as above. Warm sunny sheltered spots in the rock garden in sandy soil. Increased by seeds, cuttings, and division.

T. pyrenaicum. — A downy Pyrenean perennial 3–6 in. high, with roundish notched leaves thickly covered with soft down. Flowers in summer, purple and white, in dense terminal clusters.

Culture &c. as above. The rock garden or border. Increased by seeds, cuttings, and division.

AJUGA (Bugle). — A genus containing about 30 species of annual or perennial herbs, often decumbent or stolon- or runner-bearing, and having coarsely toothed or incised, rarely entire, leaves, the upper ones more or less bract-like. Calyx ovoid or roundish bell-shaped, 8–10-ribbed, 5-toothed or cleft. Corolla 2-lipped, with a tube slightly expanded at the throat. Stamens 4, didynamous. Ovary shortly or almost to the middle 4-lobed. Nutlets obovoid, reticulate, wrinkled.

Culture and Propagation. — The Ajugas flourish in ordinary garden soil and prefer half-shaded situations although they also succeed in the sunshine. They are easily increased at the end of summer or in spring by dividing the tufts, which may be replanted 8–9 in. apart. Seeds may also be sown in the open border in April or May, or as soon as ripe in autumn. Although not in the best sense ornamental, Ajugas are useful in the rock garden or as edgings to borders, margins of shrubberies &c.

A. genevensis (*A. alpina; A. rugosa*). A hairy runnerless European perennial 6–12 in. high, with oblong coarsely toothed green and hairy leaves narrowed at the base. Flowers in early summer, varying from blue to rose and white, in distant and spicate whorls. A very variable plant; increased by division. *A. pyramidalis* seems to be a form of it having the floral leaves crowded into 4-angled or pyramidal spikes.

Culture &c. as above.

A. orientalis.—A native of Eastern Europe 12–18 in. high, with woolly hairy stems. Leaves large, stalked, ovate, coarsely and sinuately toothed, narrowed at the base, floral ones stalkless broadly ovate deeply lobed or toothed. Flowers in early summer, blue, 6 or more in a whorl.

Culture &c. as above. This species likes dry sunny spots in the rockery. Increased by division and seed.

A. reptans. — A smooth creeping British herb 4–8 in. high, with runners and entire or sinuate ovate leaves, the lower ones stalked, the upper nearly sessile. Flowers in summer, ½–¾ in. long, blue, rarely white or rosy, in spikes 3–8 in. long.

Culture &c. as above. There are varieties having variegated or bronzy leaves more handsome than the type and useful as edging plants. They are quickly increased by division in ordinary soil, or seed.

Division III. *MONOCHLAMYDEÆ, INCOMPLETÆ,* or *ACHLAMYDEÆ* (see p. 126).

XC. NYCTAGINEÆ—Jalap Order

An order of annual or perennial herbs, rarely shrubs or trees, usually swollen at the joints, and having opposite and alternate, simple entire penninerved leaves with or without stalks, and no stipules. Flowers hermaphrodite, rarely 1-sexed, regular, often in panicles or corymbose terminal or axillary cymes, very rarely solitary or in racemes, sometimes in umbels or heads, often with a calyx-like involucre. Perianth inferior, coloured, tubular, salver- or funnel-shaped, often contracted or opened at the throat, 3–5- toothed or lobed. Stamens 1 or more, hypogynous. Fruit a 1-celled, 1-seeded utricle enclosed in the enlarged often hardened tube of the perianth.

MIRABILIS (Marvel of Peru). — A genus containing about 10 species of smooth or glandular, downy, tuberous-rooted herbs, with 2–3 forked branches, and opposite leaves, the lower ones stalked, the upper ones sessile. Flowers white, scarlet, or variously coloured, fragrant or scentless. Involucre 1- or more flowered, calyx-like, 5-lobed. Perianth tube elongated, contracted above the ovary; limb more or less salver-shaped, 5-lobed, plaited. Stamens 5–6, unequal, protruding; filaments united into a fleshy cup at the base. Fruit an obovoid leathery utricle.

M. Jalapa (*Common Marvel of Peru*). A beautiful bushy Peruvian herb 2–4 ft. high, with tuberous roots and large entire smooth, oval, acute leaves, heart-shaped at the base. Flowers late in summer, funnel-shaped, nearly 2 in. long, fragrant, variously coloured, red, white, or yellow, or striped and blotched with 2 or more colours, 3–6 in a terminal cluster.

Culture and Propagation. — This species may be treated like Dahlias in the autumn. The tuberous roots may be lifted and stored in a dry, airy, frost-proof place until the following May. Seeds which usually ripen freely, one to each flower, may also be sown in heat about February and March, the young plants being transplanted at the end of May.

The Marvel of Peru flourishes in ordinary good garden soil, especially in a mellow sandy loam. It makes an excellent flowering bush, and is very ornamental in the herbaceous border. Besides the ordinary variously coloured and streaked forms, all of which may be obtained from a packet of mixed seed, there is also one having the leaves variegated with a yellowish-green which is very curious. There is also a semi-dwarf strain in which the plants rarely exceed 18 in. high, having variously coloured flowers as in the type. Then there is a distinctly dwarf strain which grows little more than a foot high, and is said to come fairly true from seeds. These are suitable more particularly for the edges of borders, beds &c., and have a great variety of colour.

M. longiflora. — A pretty Mexican species with blackish turnip-shaped roots and much-branched clammy downy stems 2–3 ft. high, furnished with broad heart-shaped taper-pointed clammy leaves, the upper ones almost stalkless. Flowers in July and August, long and tubular, exhaling a sweet agreeable odour, varying in colour from white and pink to violet. Warm sunny borders in good soil.

Culture &c. as above. Requires similar treatment to *M. Jalapa.*

M. multiflora. — A beautiful downy species 18–24 in. high, found wild from Mexico to California, and having opposite ovate leaves. Flowers in late summer, bright purple, with a tube about 2 in. long, borne in terminal panicles each of which is enclosed in a cup- or calyx-like involucre.

Besides the species described above, a race of hybrids between *M. Jalapa* and *M. longiflora*, and perhaps also *M. multiflora*, has appeared in France, and is said to be intermediate in character between the parents. There is no doubt these plants will readily respond to the attentions of the hybridist if taken seriously in hand.

Culture &c. as above.

ABRONIA (Sand Verbena). — A genus containing about 10 species of trailing glandular downy herbs with 2–3 forked branches and opposite entire stalked fleshy leaves. Flowers fragrant, rosy, downy, in Verbena-like clusters. Perianth salver-shaped, or narrowly funnel-shaped, with 5 obcordate or 2-cleft lobes, and a long tube contracted above the ovary. Stamens 3–5. Ovary obliquely ovoid. Fruit 1–5-ribbed, or 3-winged.

Culture and Propagation. — The species described below are all natives of California. They flourish in light sandy soil in exposed sunny situations and may be planted in the rockery or at the base of a south wall. They may be increased by seeds when obtainable. As they sprout rather slowly it is advisable to peel off the outer coat and even to soak them for a few hours in warm water. The seeds may be sown either in August or as soon as ripe, or in spring in pots of light sandy soil. At whatever season sown, the seedlings must be protected under glass until the end of May, before they can be safely planted out, 18–24 in. apart, where they are to bloom. Cuttings of the young shoots will also root in spring if placed in sandy soil in a little heat or even a cold close frame.

A. arenaria (*A. latifolia*).—A pretty perennial 9–18 in. high, with broadly ovate or kidney-shaped leaves on short thick stalks. Flowers in July, lemon-yellow, about ½ in. long, in dense clusters and exhaling a honey-like fragrance.

Culture &c. as above. This species has a trailing habit and is suitable for growing in light dry soil in sunny parts of the rockery or border. Increased by seed and cuttings.

A. fragrans.—A more or less erect-growing much-branched species, 1–2 ft. high, with terminal and axillary clusters of pure white fragrant flowers in summer, which open only in the evening or late in the afternoon.

Culture &c. as above. As this species does not often, or rarely ever, ripen seeds in this country, it must be increased by cuttings or imported seeds. It likes a rather rich, mellow soil.

A. umbellata (*Tricratus admirabilis*). A charming trailing species, 6–24 in. high, with oval or oblong elliptic leaves, and dense terminal clusters of slightly scented, rosy-pink flowers in early summer and autumn.

Culture and Propagation.—Although really a perennial under greenhouse treatment, this species is easily raised from seed every spring as a tender annual. It likes a light, well-drained soil, and warm sheltered spots, and produces its seeds freely.

Other species are *A. Crux-Mastæ*, white, and *A. villosa* with violet flowers.

XCI. ILLECEBRACEÆ

An order of annual or perennial usually small tufted herbs, with opposite or alternate leaves. Flowers regular, often hermaphrodite or two-sexed, inconspicuous. Sepals 4–5 distinct or united. Petals small or none. Stamens perigynous or hypogynous, equal to the perianth segments in number. Utricle 1-seeded, enclosed in the perianth.

There are few plants of this order of any garden value. *Herniaria glabra*, the Rupture-wort, is a British prostrate herb forming dense masses of small leaves $\frac{1}{6}$–$\frac{1}{4}$ in. long, which remain green throughout the year, and render it valuable as a carpet plant. *Paronychia argentea*, the silvery Whitlow Grass or Nailwort, is a closely related plant, forming dense, compact, green and silvery patches, 1 ft. or more across. *P. serpyllifolia*, with trailing stems and masses of small, roundish, or obovate ciliate Thyme-like leaves, makes a good green carpet for beds, and is largely used for this purpose. They all flourish in light, sandy soil, and may be increased readily by dividing the tufts in autumn or spring, and also by seeds.

XCII. AMARANTACEÆ—Cockscomb Order

An order of herbs or undershrubs, rarely small trees, erect or rarely with creeping or climbing branches. Leaves opposite and alternate, membranous, fleshy or leathery, usually entire. Inflorescence various, often in spicate heads, rarely racemose. Flowers small hermaphrodite, rarely polygamous, monœcious, or diœcious, clustered in heads or spikes. Perianth 4–5-parted, segments free or united at the base. Stamens 1–5, hypogynous, or inserted on the base of the perianth segments. Fruit a membranous utricle, rarely a fleshy berry.

CELOSIA (Cockscomb).—A genus of annual herbs, rarely shrubs or bushes, smooth or hairy, with round or angled stems. Leaves alternate, often narrowed into a stalk, linear oblong ovate or obovate, quite entire or rarely lobed. Flowers hermaphrodite in dense spikes at the ends of the shoots and in the axils of the leaves, white, silvery, or rosy, shining. Perianth scariose 5-parted, with oblong or lance-shaped segments. Stamens 5, the slender filaments united at the base into a membranous cup.

Culture and Propagation. — The Celosias must be treated as tender annuals, as they are not hardy enough to stand out of doors except during the summer months. To obtain the best effects they should be planted in masses in sheltered sunny positions in rich sandy loam and leaf soil. Seeds may be sown in heat about March, and the seedlings should be pricked out when large enough to handle easily. To obtain very sturdy plants the seedlings may be pricked out a second time or grown singly in pots with as much light and air as possible when they have recovered from the moving. By the end of May or early in June, according to the weather, the plants may be transferred to the open garden, and placed about 1 ft. apart in masses. They require abundance of water during the summer, and an occasional watering with liquid cow-manure will enhance their vigour and beauty.

C. cristata (*Cockscomb*). — A slightly branched East Indian annual 1½–2 ft. high, with strong smooth and striped slightly branched stems, and bright green oval-lance-shaped leaves sometimes more or less crinkled and strongly veined. The small dark red flowers appear during the summer and autumn in dense oval or elongated spikes.

Such are the characteristics of the typical *C. cristata*, but the art of the gardener has produced many extremely curious and highly interesting changes, chiefly in the inflorescence. The plume-like spike of flowers is replaced by a thick consolidated mass of velvety tissue, the result of the flower-stem becoming much dilated and flattened at the top and curled and crimped into fantastic shapes. The small flowers are placed in the axils of the shining scales which cover the surface, and it is among these scales that the seeds must be looked for later on. There are now many shades of colour among the Cockscombs, such as deep crimson, red, yellow, purple, rose, violet, &c. Besides the change in colour the plants have also been sensibly dwarfed by cultivation, and some of them are not more than 9 in. high. A very ornamental variety of the Cockscomb is *C. cristata variegata*, which has a more branching habit than the type, variegated leaves, and graceful erect plumes of flowers varying in colour from crimson to red, yellow, and violet.

Culture &c. as above.

AMARANTUS. — A genus of erect or decumbent, smooth or downy, rarely hairy annuals. Leaves alternate, narrowed into a stalk at the base, ovate lance-shaped or linear, entire or rarely sinuate-toothed, often ending in a sharp point. Flowers monœcious or polygamous, small, borne in clusters in the axils of the upper leaves, or in dense panicles or trusses at the ends of the shoots. Perianth segments 5, rarely 1–3, membranous. Stamens 5, rarely 1–3. Ovary ovoid or flattened; style short or none; stigmas 2–3 awl-shaped or slender, papillose or hairy.

Culture and Propagation. — The Amarantuses flourish in ordinary good garden soil, but enjoy a rich sandy and well-manured loam. They are very effective during the summer months planted in bold masses in the flower border or along the edges of the same. Some of the varieties are also well adapted for vase decoration, and may be used for this purpose with other plants, so long as the colour hues do not clash. Most of the kinds are easily raised from seeds sown in gentle heat in March and treated in the same way as annuals in general (see p. 78). When the seedlings are large enough to handle easily they should be pricked out into pots or pans of light rich sandy loam and leaf mould, and grown on with as much light and air as possible until the end of May or beginning of June, when they may be transferred to the outdoor garden fully hardened off.

Like the Cockscombs they like plenty of water in summer, and are benefited by an occasional dose of liquid manure.

A. caudatus (*Love Lies Bleeding*).—A vigorous and ornamental Indian annual 2–3 ft. high, with bright green oval obtuse leaves borne on angular striped stems. The minute deep crimson-purple flowers appear in summer, and are borne in dense clusters arranged in gracefully drooping cylindrical spikes. There is a variety with yellow flowers which is not considered so attractive as the type.

Culture &c. as above.

A. hypochondriacus (*A. cruentus*).—*Prince's Feather*.—A beautiful Indian annual 4–5 ft. high, remarkable for its deeply veined ovate lance-shaped leaves, which are of a purple colour on the under surface. The deep crimson flowers are densely packed on erect pyramidal spikes at the ends of the shoots, and look very handsome, especially in the improved form known as *atropurpureus*.

Culture &c. as above.

A. salicifolius. — A beautiful annual 2–3 ft. high, native of the Philippine Islands. The gracefully drooping wavy Willow-like leaves, 7–15 in. long, are beautifully coloured near the tips with orange, crimson, and bronzy-purple, and are decidedly attractive, forming the chief beauty of the plant, especially in the fine variety called *Princess of Wales*.

A. Henderi is a garden form closely related to *A. salicifolius*. It is pyramidal in habit, and has lance-shaped wavy leaves, variously tinted with rosy-carmine, orange, yellow, and green.

Culture &c. as above.

A. sanguineus.—Another East Indian annual 2–3 ft. high, remarkable for its oval, stalked, blood-red leaves, and loose spikes and clusters of purple flowers.

Culture &c. as above. Towards the end of summer and during the autumn this species is seen at its best, the foliage then being of a brilliant hue. It is a good plant for massing on grass as well as in beds and borders.

A. speciosus. — An elegant Indian annual 3–5 ft. high, with strong fleshy and slightly branched stems, slightly angled and reddish in colour. The leaves are long-stalked, oval lance-shaped, blunt, and more or less deeply tinged or washed with red. The deep crimson-purple flowers are borne in large erect spikes, the whole forming a beautiful plume-like panicle. There is a form with golden-yellow plumes.

Culture &c. as above.

A. tricolor.—A beautiful Indian annual 2–3 ft. high with thickish furrowed stems, and oval or oblong lance-shaped tapering leaves, remarkable for their beautiful reddish-purple or carmine colouring from the base to the middle, followed by a broad yellow zone and ending in a green point. The somewhat winged stalk is green or yellow, and the older leaves are usually not so highly coloured as the young ones. Closely related to this is a well-known form called *A. melancholicus ruber*, a compact-growing plant about 1 ft. high, with large crimson-coloured leaves. It is useful on this account for massing in beds and borders.

Culture &c. as above. *A. tricolor* and its forms seem to be a little more tender than the others, and should therefore be planted in warm and sheltered spots.

ALTERNANTHERA (JOY WEED). A genus of trailing or decumbent, rarely erect, branched, smooth, downy or woolly herbs. Leaves opposite, with or without stalks, obovate oblong or linear, entire or slightly toothed. Flowers small, hermaphrodite, borne in small heads. Perianth 5-parted.

Culture and Propagation.—Alternantheras were at one time much more extensively employed for making carpet-beds and edgings than they are now. Being natives of the tropics and subtropics they are too tender for the outdoor garden except during the warmest period of the year. They are chiefly valuable for the rich colouring of the foliage, which varies from yellow and bronze to deep purple and crimson. It is only by using them in very large masses that any appreciable effect can be obtained, so that the work of propagation is rather heavy where quantities are required. The plants are usually increased by means of cuttings taken about April from old plants that have been lifted in autumn and grown in the warm greenhouse during winter. It is essential, to secure good and quick results, to root the cuttings in a hotbed or frame with a temperature of about 80°–85° F. The cuttings are usually dibbled in about 1 in. apart in rich sandy loam and leaf soil, and kept moist and shaded for a few days until the roots begin to develop. As soon as this takes place the shading may be removed, and the amount of air may be gradually increased so as to make the plants sturdy and hardy. As much light as possible should be given once the plants are rooted, as this is the only way to secure a good colour in the leaves. For this reason the cuttings are usually rooted in a hotbed, so that the surface is within a few inches of the glass. The following are some of the chief kinds grown:—

A. amabilis. — A Brazilian species with elliptic tapering leaves having red veins and a mixture of green, red, orange, and rose over the surface. The variety *amœna* is a pretty little plant with smaller spoon-shaped leaves washed with orange, red, and purple, intermixed with green and bronze. The variety *tricolor* has smooth broadly ovate leaves with dark green edges, a bright rose centre veined with purple, and with an irregular band of orange or yellow between the rose centre and the green margin.

Culture &c. as above.

A. paronychioides.—A dense and compact-growing species forming tufts 3–4 in. high. It has narrow spoon-shaped leaves of a deep orange-red colour shaded with olive green. There are a few handsome forms, such as *magnifica*, which has more highly coloured foliage; *major*, with bronzy leaves tipped with orange; and *major aurea*, the leaves of which have a bright golden-yellow hue.

Culture &c. as above.

A. versicolor. — A compact-growing Brazilian species with ovate leaves of a bright rosy-pink and crimson shaded with bronzy-green.

Culture &c. as above.

GOMPHRENA (Globe Amaranth). A genus of erect or trailing herbs more or less hairy, often with swollen joints. Leaves opposite, sessile or shortly stalked, entire. Flowers hermaphrodite, usually in small round heads, very rarely in spikes. Perianth 5-parted, often woolly at the base.

G. globosa. — A pretty East Indian annual about 18 in. high, with oblong downy leaves and solitary round heads of shining violet flowers borne at the end of the shoots in summer. Strictly speaking, it is not the flowers proper, but the scales or chaffy bracts surrounding them, which constitute the chief attraction of the plant. There are several varieties, such as *alba, aurea, carnea, purpurea*; but *nana*. which grows only about 4 or 5 in. high, and makes a compact bushy plant with deep red flower-heads, is one of the best.

Culture and Propagation.—Although there are about 70 species of Gomphrena known altogether, the above is the most valued for the outdoor garden. It may be grown as a tender annual in the same way as the Celosias. Seeds may be raised in gentle heat in March and April, and when large enough the seedlings are to be pricked off and grown on so as to be ready for planting out at the end of May or beginning of June. They like a light rich soil and warm sheltered positions, and may be used for edgings, or massing in the flower-border, or in beds by themselves.

IRESINE. — A genus of erect or somewhat trailing, smooth, woolly, or downy herbs, with opposite, stalked, entire or serrulate leaves. Flowers small, hermaphrodite or diœcious, borne in panicles or clusters. Perianth 5-parted. Stamens 5.

I. Herbsti (*Achyranthes Verschaffelti*). A handsome Brazilian plant 1–1½ ft. high, with bright crimson stems and leaves, the latter being somewhat heart-shaped in outline, and deeply notched at the apex. The upper surface is much deeper in colour than the under one. The variety *acuminata* has sharply tapering leaves, while *aureo-reticulata* has leaves the same shape as the type, but greenish in colour, banded with golden-yellow along the main veins, the stems and leaf-stalks being deep crimson-red.

Culture and Propagation.—The Iresines are popular plants for massing in groups and beds, and for edgings in the flower border during the summer months. They are chiefly valued for their ornamental and deeply coloured foliage, which in favourable seasons becomes particularly fine. The plants like a rich sandy and well-manured loam, and warm sunny situations sheltered from cold winds.

They are usually increased by cuttings of the young shoots in spring inserted in light rich sandy soil in close frames or hotbeds in the same way as the Alternantheras. So as to have a stock of plants for producing cuttings it is necessary to grow some of the old plants in a greenhouse during the winter; or cuttings may be rooted in pots about August and September, and kept for the purpose until spring. By placing the plants in heat and moisture young growths soon appear, and these may be detached and used as cuttings as mentioned above. Red Spider and Greenfly are sometimes troublesome to the plants in winter, but they may be checked by fumigating, or by syringing with soft-soapy water.

I. Lindeni.—A very ornamental and compact-growing species 1–1½ ft. high, native of Ecuador. It has narrow oblong lance-shaped leaves richly coloured with deep crimson-red, the central zone along the midrib being of a brighter hue.

Culture &c. as above for *I. Herbsti.*

XCIII. CHENOPODIACEÆ—Beetroot Order

An order of herbs or undershrubs with alternate, or sometimes opposite, leaves, without stipules. Flowers small, hermaphrodite, sometimes polygamous. Calyx deeply divided, inferior. Stamens equal in number to the calyx segments, hypogynous or perigynous, filaments usually free. Ovary superior 1-celled; style simple or 2–3-lobed; or styles 2–5. Utricle indehiscent.

HABLITZIA.—A genus with only one species:—

H. tamnoides. — A tall climbing Caucasian herb, with long-stalked, alternate triangular heart-shaped pointed, entire membranous leaves. Flowers from July to October, small green, in great profusion on branched cymes. Perianth herbaceous, cut into 5 bluntly oblong segments. Stamens 5.

Culture and Propagation.—This plant likes a good, rich, loamy soil, and plenty of water during the summer months, but comparative dryness in winter. It may be trained up pillars or posts, over rocks, old tree stumps &c., and looks effective in open exposed situations. It is increased by division in autumn, and by sowing seeds in spring in gentle heat, afterwards transferring the pricked-out seedlings to the open ground in mild weather.

CHENOPODIUM (GOOSEFOOT).—A genus of annual or perennial powdery or glandular downy, sometimes strong-smelling or aromatic herbs, rarely woody at the base. Leaves alternate, sessile or stalked, linear, oblong-ovate, deltoid or hastate, entire sinuate-toothed, lobed or almost pinnately cut. Flowers usually hermaphrodite, minute in axillary clusters, and in simple or branched terminal spikes. Perianth 5, very rarely 1-3-4- parted or lobed. Stamens 5 or fewer, hypogynous or somewhat perigynous, filaments sometimes united at the base. Style none, rarely elongated; stigmas 2–5, free or united at the base. Utricle ovoid and erect, or globose and depressed.

There are about 50 species mostly weeds. The herb called 'Good King Henry' or 'All Good' (see p. 1158) belongs to this genus.

C. Atriplicis (*C. purpurascens*) is a vigorous Chinese annual, about 3 ft. high, with angular reddish stems, the young shoots and leaves being covered with a fine rose-violet powder. Leaves numerous, stalked, heart-shaped, deltoid. Flowers bright reddish-purple in clustered heads.

Culture and Propagation.—Owing to its colour this species is more or less useful in beds or groups on grass. By pinching out the tips of the young shoots, the plants assume a very bushy habit. It flourishes in ordinary soil, and may be raised from seed sown in the open border in April or May, thinning or pricking the plants out to 18–24 in. apart. When grown in bold masses it is very ornamental.

C. capitatum (*Blitum capitatum*).—*Strawberry Blite.*—A S. European annual 12-18 in. high or more, with alternate triangular leaves and insignificant flowers, succeeded by highly red-coloured calyces, which envelop the small Strawberry-like fruits.

Culture &c. as above for *C. Atriplicis.* Raised from seed sown in the open border in April. *C. virgatum* (*Blitum virgatum*) is somewhat similar.

C. Scoparium (*Kochia scoparia*).—*Belvedere.*—A distinct S. European annual 3–5 ft. high, forming a small Cypress-like bush with alternate linear lance-shaped pale green leaves. Flowers green, minute, in long spikes.

Culture &c. as above for *C. Atriplicis.* Although entirely green this curious species, owing to its compact, pyramidal, and graceful habit, may be used with effect on grass or in borders.

BETA (Beetroot).—A genus of smooth-leaved shining herbs, with thick, fleshy roots, and small hermaphrodite flowers. Perianth single, half inferior, 5-cleft, persistent. Stamens 5, perigynous.

The Beetroot is mentioned here, not on account of the beauty of its small flowers, but because of the beautiful foliage of some varieties which are much used for decoration in sub-tropical gardening during the summer months.

B. Cicla variegata, known as the Chilian Beet, has handsome shining leaves 3 ft. or more long, and 1 ft. across, brilliant in colour and variegation, and having midribs varying from dark orange to scarlet. The seeds are sown in slight heat in February or March, and the seedlings thinned or pricked out to make more sturdy growth. By the end of May they may be transplanted to the open ground.

Another variety, known as the Dracæna or Croton-leaved Beet, is also useful for producing ornamental effects. It has long, narrow, recurved leaves, forming a bunch on the top of the root. When the seedlings are well up, it is easy to select the plants having the most ornamental foliage, as they vary a good deal.

The Victoria Beet (*B. hortensis metallica*) is a beautiful form with deep blood-red glistening leaves. The roots may be used in the ordinary way. They all flourish in ordinary good garden soil, and may be treated as advised for the ordinary Beetroot at p. 1151.

XCIV. PHYTOLACCACEÆ—Poke Weed Order

An order of trees, shrubs, or herbs, woody at the base. Leaves alternate, quite entire. Stipules none, or small, or reduced to tubercles. Flowers hermaphrodite or 1-sexed, usually in racemes, rarely axillary, often green or white. Perianth inferior, herbaceous or leathery, 4–5-parted, sometimes coloured; segments equal or unequal, oblong or roundish, obtuse. Petals usually absent. Stamens 4 or more, rarely perigynous, often inserted on the hypogynous disc; filaments free or united at the base. Ovary superior. Fruit berry-like or dry, composed of one or several distinct or more or less united 1-seeded carpels.

PHYTOLACCA.—A genus containing about 10 species of shrubs, herbs, or trees, erect or climbing, with round, furrowed, or angular branches. Leaves alternate, with or without stalks, acute or blunt, quite entire, and without stipules. Flowers hermaphrodite, rarely diœcious or 1-sexed by abortion, usually racemose. Perianth of 4–5 green or coloured equal, oblong obtuse, spreading or reflexed segments. Stamens 5–25, reduced to small staminodes in female flowers. Fruit fleshy and juicy, sometimes deep purple, roundish depressed, and composed of 5–12 free or united carpels.

Culture and Propagation.—The species described below are beautiful and distinct border plants, and may be grown easily in ordinary garden soil. They are particularly effective in large masses, especially on lawns or grass-land. In autumn the foliage assumes a reddish tinge, and the general effect is enhanced by the cylindrical spikes of flowers which are succeeded by masses of purple-violet berries. The plants may be increased by dividing the rootstocks in spring. Seeds may also be sown in spring in cold frames, and the seedlings transplanted when large enough about a yard apart to allow them to fully develop.

P. acinosa. — A Himalayan species related to *P. decandra*, from which it is readily distinguished by its green and slightly branched stems rarely exceeding 3 or 4 ft. high, by its oblong elliptic usually green leaves, and its white or slightly blush flowers in erect spikes 6–8 in. long.

Culture &c. as above.

P. decandra (*Virginian Poke Weed; Pigeon Berry; Red Ink Plant*).— A vigorous but rather unpleasant smelling N. American perennial 8–10 ft. high, with large fleshy and poisonous roots, and erect purplish stems branched at the top. Leaves about 6 in. long, stalked ovate, green at first, changing to a beautiful purple in autumn. Flowers in summer, white with 10 stamens, succeeded in autumn by spikes of dark purple berries, composed of 10 united carpels filled with a crimson juice, which has been likened to red ink—hence one of the popular names.

Culture &c. as above. Suitable for the rougher parts of the garden among bold and somewhat coarse growing plants.

P. icosandra (*P. mexicana*).—A bushy Mexican perennial 2–3 ft. high, having rather thick elliptic or oblong-ovate taper-pointed leaves 4–9 in. or more long, including the slender stalk. Flowers in summer, pinkish-white, having 20 stamens, and borne in long loose racemes 6–12 in. long, succeeded in autumn by roundish depressed berries, somewhat resembling very ripe Blackberries.

Culture &c. as above.

ERCILLA.—A genus with only one species :—

E. volubilis (*Bridgesia spicata*).—A handsome climbing shrub native of Chili and Peru, with alternate ovate heart-shaped or oblong rounded thick leathery leaves 2–3 in. long. Flowers in March and April, hermaphrodite, purplish, sessile, in dense racemes springing from the axils of the shortly stalked or sessile leaves. Perianth with 5 oblong blunt equal lobes. Stamens 8–10. Fruit berries consisting of 4–8 free ovoid compressed carpels.

Culture and Propagation.—This is an excellent plant for covering walls, over which it rapidly spreads, and seems to be perfectly hardy, at least as far north as the Thames Valley. It flowers profusely and remains in good condition for three or four weeks. It is not very well known although it has been introduced to cultivation about 50 years. It is probably increased by seeds and cuttings of the more or less ripened shoots in summer and autumn, inserted in cold frames in sandy soil.

XCV. POLYGONACEÆ—Rhubarb Order

A natural order of herbs, shrubs, or sometimes trees. Leaves alternate or rarely opposite, variously shaped, rarely lobed or divided, the stalks often more or less dilated and sheathing at the base, and having ocreate stipules. Flowers hermaphrodite or 1-sexed in a few genera, regular, usually small, springing from the leaf axils or bracts, solitary or clustered in racemes or spikes. Perianth inferior, consisting of 4–6 calyx-like or coloured lobes or segments. Stamens 6–9, rarely fewer, or many more; filaments free, or united in a ring at the base. Ovary superior 3- (rarely 4-) angled or compressed, 1-celled. Styles 3, 2, or very rarely 4. Fruit usually a triangular indehiscent 1-seeded nut, often enclosed by the perianth.

Besides the genera and species described below, it may be mentioned that the well-known Dock (*Rumex*) belongs to this order. The Docks, which are recognised by the perianth having 6 segments, the 3 inner ones of which usually grow larger, 6 stamens and 3-angled fruit, are not usually included in books dealing with ornamental garden plants; but what is so graceful and vigorous by the side of a stream or lake as a fine clump of bright green

Dock leaves? *R. Hydrolapathum* is particularly handsome, with its erect branched stems 3–6 ft. high, and broad, oblong lance-shaped leaves 1–2 ft. long, rounded at the base, and having wingless stalks 6–10 in. long. In autumn the leaves assume a rich coppery red, and are very ornamental.

ERIOGONUM. — A genus of tufted perennial herbs or undershrubs or slender annuals, more or less downy or woolly. Leaves clustered at the base of the stems, nearly radical, or a few on the stems, alternate, entire, with the stalks more or less dilated, and stem-clasping at the base, without ocreate stipules. Perianth more or less deeply 6-cleft. Stamens 9; filaments often bearded at the base. Fruit a 3-angled or 3-winged nut.

E. umbellatum. — A densely tufted species with obovate oblong or spoon-shaped leaves more or less woolly or downy, especially beneath, and from the centre of which spring up stems 3–12 in. high bearing golden-yellow blooms in umbels about 4 in. across. There is a variety called *Sileri*, rather better than the type.

Culture and Propagation. — These plants grow in a mixture of loam and peat and may be increased by seeds sown in spring in cold frames, or by dividing the tufts at the same period. About 100 species have been described, all natives of North America, but the above is the only species which seems to grow at all well in the British Islands. It flourishes in light sandy soil in the rockery, and flowers profusely in the summer months. Other species sometimes seen are *compositum*, with dull white or rosy flowers; *corymbosum*, flowers varying from white to deep rose, rarely yellow; and *stellatum*, yellow. If they can be obtained they may be all grown in the same way as *E. umbellatum*, but seeds or plants are rarely offered.

POLYGONUM (Knot Grass; Knot Weed). — A genus of herbs or undershrubs, sometimes low, slender, and trailing, sometimes tall and erect, and sometimes long climbing. Leaves alternate, with ocreate stipules. Flowers in clusters, racemes, panicles, or spikes, usually hermaphrodite. Perianth usually coloured, and composed of 5 nearly equal segments, or the 3 outer ones sometimes enlarging over the flat-leaved or 3-angled fruit. Stamens 5–8. Ovary compressed or 3-angled; styles 2–3. About 150 species have been described, of which the following is a fairly full list of the best kinds for garden decoration.

Culture and Propagation. — They flourish in ordinary garden soil, and look very handsome when fully in leaf and blossom. The perennial species are increased by dividing the roots in autumn or early spring and by layering the stems. The annuals are raised from seed sown in the open border about April and May, or earlier in the year, about March, in gentle heat, afterwards transferring the young plants to the open air about the end of May or early in June.

P. affine (*P. Brunonis*). — An ornamental perennial 6–8 in. high, native of Nepaul, containing few narrow oblong lance-shaped leaves, and dense spikes of rosy-red flowers during the late summer and autumn.

Culture &c. as above. Suitable for the margins of lakes, ponds &c., or moist borders. Increased by division.

P. amplexicaule. — A Himalayan perennial 2–3 ft. high, with heart-shaped ovate or lanceolate long tapering pointed leaves, the lower ones long-stalked, the upper ones sessile, stem-clasping. Flowers in autumn, bright rosy-red or white, in solitary or twin racemes 2–6 in. long.

Culture &c. as above.

P. baldschuanicum. — A pretty Bulgarian climber, with ovate heart-shaped taper-pointed leaves 2–4 in. long. Flowers in summer, white, borne in great profusion and almost entirely hiding the foliage.

Culture &c. as above. It is an excellent plant for trailing up posts, stakes &c., pyramidal fashion, and looks remarkably well on lawns or grass land away from shrubs &c. The easiest way to increase this species is by layering the stems in late summer and autumn, as plants are with difficulty obtained from seeds, division or cuttings.

P. Bistorta (*Bistort; Snakeroot*). — This is a native of wet meadows and pastures in Great Britain and the north temperate regions of the Old World generally. It grows 1–2 ft. high, with stiffish slender stems arising from the creeping, twisted, and somewhat tuberous rootstocks. Leaves oblong ovate, wavy, sea-green beneath, 3–6 in. long, with winged stalks. The white or pink flowers, with protruding stamens, are borne in dense cylindrical racemes from June to September, and are very attractive.

Culture and Propagation.—Although common enough as a native plant, this species is not without merit for furnishing moist parts of the rockery and border among the less choice kind of plants. When grown in bold masses in the rock garden or flower border it is very handsome and attractive. It may be easily increased by division of rootstocks in early autumn or spring.

P. capitatum.—A pretty little North Indian annual with ovate or elliptic leaves 2 in. long, green marked with dark crescent-shaped bands from the middle to the base. Flowers pink, small, in dense round heads on long stalks from the axils of the upper leaves.

Culture &c. as above. This species has slender hairy stems which root at the joints, and the plant may be increased by this means year after year.

P. compactum is closely related to *P. cuspidatum*, and is probably only a dwarf variety of it. It grows 2–4 ft. high, and is denser and more compact in habit, with conspicuous red stems and leaf-stalks. The broadly heart-shaped ovate leaves are of a darker green and somewhat crimped, and the white flowers are borne in erect racemes in summer.

Culture &c. as above. Increased by division.

P. cuspidatum (*P. Sieboldi*).—A bold and handsome Japanese perennial 4–10 ft. high, with creeping roots and round arching stems, striped and tinged with purple-red. Leaves stalked, broadly oval oblong acute, and tapering at the apex. Flowers in summer, creamy white, in feathery panicles 4–6 in. long, drooping from the axils of the leaves.

Culture and Propagation.—This fine plant has the misfortune to make itself a nuisance when planted in borders or shrubberies. Its rootstocks creep beneath the surface for some distance, and throw up new plants at every point, and the more they are chopped up the more they grow, unless completely eradicated. In a bed on grass by itself where the roots can be kept within bounds this species is most ornamental.

P. cymosum.—A very distinct and handsome Chinese species with peltate leaves shaped almost like an equilateral triangle, silvery white beneath, green above, with a purple mark showing the junction of the blade and stalk. Stems green and purple, glaucous, about 2 ft. high. Flowers in July and August, white, thrown well above the foliage.

Culture &c. as above. A handsome plant for the front of borders or shrubberies in light soil and open sunny situations. Increased by division.

P. dumetorum.—A British climber with angled stems and heart-shaped sagittate Convolvulus-like leaves, and masses of white flowers in July and August.

Culture &c. as above for *P. baldschuanicum.*

P. filiforme variegatum.—A beautiful Japanese perennial 18–24 in. high, with purplish stems, and oval slightly wrinkled leaves 3–4 in. long, variegated with creamy yellow blotches and streaks.

Culture &c. as above. Very effective in masses. Increased by division.

P. lanigerum.—A pretty herbaceous perennial 6–10 ft. high, native of the warmer parts of the Old World. It has lance-shaped wavy leaves covered with a silvery white down, and produces carnation-red flowers in clustered spikes.

Culture and Propagation. — This little-known species is probably too tender to stand the winter without protection of the crowns by means of dry leaves, litter &c. It may be increased by division in spring.

P. multiflorum.—A pretty climbing or trailing perennial, native of North China and Japan. It has tuberous roots and slender reddish stems, the latter being furnished with smooth shining thickish leaves about 4 in. long, heart-shaped ovate acute in outline, with bright red stalks and a truncate stipule or ocrea at the base. The small whitish flowers are produced in summer in loose spreading panicles, which give a graceful appearance to the plant.

Culture &c. as above. This species may be used for trailing over low fences, old tree stumps or rocks, and may be increased by division.

P. orientale (*St. John's Staff*).—A beautiful East Indian annual, growing in one season from 8 to 10 ft. high, having knotted, downy stems branched towards the top. Leaves large, alternate, oval acute, downy, with sheathing stalks. Flowers in August, deep rosy-purple, in long drooping racemes from the axils of the leaves and the ends of the branches. There is a variety with white flowers, and also one having the leaves beautifully variegated with green and gold, the flowers being of a clear lilac colour.

Culture and Propagation.—This species is useful for the decoration of parks and large gardens in masses by itself or among thin shrubberies; by the sides of streams, lakes or ponds, or even on lawns it looks particularly ornamental. It flourishes in ordinary good garden soil, and requires abundance of water during the summer months and during its rapid growth. Seeds may be sown in the open ground in April and May, or under glass before that time, and the seedlings transplanted at a distance of about 2 ft. when large enough.

P. sachalinense.—A vigorous perennial 10–12 ft. high, native of the Sachalin Islands. Leaves 8–12 in. long, more or less broadly ovate oblong, tapering to a point, glaucous and prominently veined beneath. Flowers late in summer, of a delicate green, in slender drooping axillary racemes.

Culture &c. as above. This resembles *P. cuspidatum*, but is readily distinguished by its angular striped stems and larger leaves. It flourishes in moist soil and is effective near ponds, lakes &c., or among bold groups on grass land or lawns, and may be increased by division in early autumn or in spring.

P. sphærostachyum.—A pretty Himalayan species with linear-oblong or lance-shaped acute leaves 3–5 in. long, somewhat crisped and crenulate, smooth, glaucous or downy beneath; lower ones stalked, upper ones sessile. Flowers in August and September, blood-red, in broad cylindrical rounded spikes.

Culture and Propagation.—This attractive species is usually perfectly hardy, but is rather slow-growing, and should therefore be allowed to make large clumps before being disturbed for purposes of increase. A little mulching of well-rotted manure in autumn or winter will serve to keep the soil in a fertile condition. Besides dividing the roots in spring, seeds may also be sown in cold frames as soon as ripe in autumn, and the young plants, if sturdy enough, may be transferred to the open ground the following spring. Seedlings, however, do not bloom well until the second or third year after sowing the seed. The plants like plenty of sunshine and water in summer, and thoroughly well-drained soil, so that the roots will not be chilled by the wet in winter.

P. vaccinifolium.—A pretty Himalayan perennial with woody trailing stems, and smooth ovate or elliptic bright green leaves, sometimes tinged with red above. Flowers late in summer and autumn, bright rose, freely produced in long roundish spikes.

Culture and Propagation.—An excellent species for the rock garden, where it can trail over rocks, boulders, old tree stumps &c. Increased by division and seed.

RHEUM (RHUBARB).—A genus of vigorous, rather coarse-growing perennial herbs, with a thick and rather woody rootstock. Leaves very large, radical sinuate-toothed or palmately lobed, strongly nerved; stipules ocreate, membranous. Flowers in racemes, panicles or clusters on erect branched leafy stems. Perianth composed of 6 petaloid, almost equal segments. Stamens 9, rarely 6. Ovary 3-angled; styles 3. Fruit a broad or narrowly 3-winged nut.

Culture and Propagation.—The Rhubarbs flourish in a deep rich loamy soil, and when judiciously planted give a luxuriant and picturesque appearance to a garden. Care, however, must be taken not to introduce the kitchen garden style into the flower garden. A plant here and there in the shrubbery or in the wilder parts of the garden is quite sufficient to produce a good effect. They may all be increased by seeds sown in spring on a gentle hotbed, the seedlings being afterwards transferred to the open ground about the end of May. The rootstocks may also be divided in autumn or early spring. Owing to the more or less glossy nature of the leaves, and the ease and rapidity with which most of the kinds grow, they are particularly suitable for growing in smoky localities.

R. acuminatum.—A native of Sikkim about 3 ft. high, remarkable for having slender roots several feet long. Leaves broadly heart-shaped, with a deep sinus, tapering to a point, somewhat downy below, and having slender stalks channelled on the upper side. Flowers lurid or brownish-purple, or blood-red, in slightly branched panicles.

Culture &c. as above.

R australe.—A Nepalese species with branched spindle-shaped roots and leafy stems 6-10 ft. high. Leaves roundish, broadly heart-shaped, obtuse, flat, 3-4 in. long, on slender, more or less furrowed stalks about 4 in. long. Flowers in long dense racemose panicles; calyx purple.

Culture &c. as above. This species retains the freshness of its foliage for a long time, especially if the flower stems are not allowed to develop.

R. Emodi.—A fine Himalayan species 6-10 ft. high with blunt broadly ovate heart-shaped slightly wavy leaves having 5-7 reddish nerves and half-round stalks. Flowers whitish, in dense clustered panicles.

Culture &c. as above.

R. nobile.—A beautiful Sikkim species about 3 ft. or more high, with thick fleshy roots sometimes many feet long. Leaves large bright glossy green with red stalks and nerves and fragile pink stipules. Flowers green, very small, in short branched panicles concealed by pale yellow bracts, some of which are edged with pink.

Culture &c. as above.

R. officinale.—A stately ornamental species 8-10 ft. high, native of Thibet. Leaves large roundish kidney-shaped 5-nerved and cut into 5 short unequally incised lobes at the edges. Flowers greenish, small, in dense spikes.

Culture &c. as above. This is considered to be the finest Rhubarb in cultivation.

R. palmatum.—A rather slow-growing species about 5 ft. high, native of E. and N. Asia, with roundish heart-shaped palmately lobed 3-5-nerved leaves; lobes ovate-oblong or lance-shaped, acute, undivided incised toothed or pinnately cut. Flowers in a leafy panicle. The variety *tanguticum* is a beautiful one, with longer and narrower leaves and less deeply lobed.

Culture &c. as above.

R. Rhaponticum.—This is the common Rhubarb which has been grown in British gardens for more than 300 years. It is a native of Siberia, and reaches a height of 3 or 4 ft. It has roundish deeply heart-shaped wavy smooth green leaves on long thick fleshy stalks, channelled or flattish above, rounded below. Flowers whitish, in dense leafy clustered panicles.

Culture &c. as above.

R. undulatum.—A native of Siberia, Tartary &c., with smooth green stems 4-5 ft. high, and large ovate heart-shaped wavy 5-7-nerved leaves, smooth above, rather downy beneath, on long half-round stalks, channelled above. Flowers in dense clustered panicles.

Culture &c. as above.

There are other kinds of Rhubarb, the most noteworthy being *compactum*, from E. Siberia, with broadly oval wavy lobed leaves; *Ribes*, a very rare Persian plant, with broad roundish or kidney-shaped leaves 3 ft. wide, characterised by their stiffness and protuberances; one of the most ornamental features, however, is probably the number of scarlet 3-winged fruits, which are borne in huge trusses after the blossoms; *hybridum*, a garden form somewhat like *palmatum*, with broadly oval heart-shaped wrinkled leaves; *rugosum*, from Siberia, with leathery wrinkled and puckered leaves. From this species, which is readily recognised by its thick leaf-stalks, have been derived the *Victoria*, *Lincoln*, *Prince Albert*, and other Rhubarbs. (See p. 1154.)

MUEHLENBECKIA.—A genus of climbing shrubs or undershrubs with alternate stalked, sometimes small roundish leaves, sometimes larger heart-shaped deltoid or sagittate, and sometimes linear. Flowers small, within sheathing clustered bracts, polygamous, subdiœcious. Perianth composed of 5 nearly equal lobes or segments, the 3 outer ones of which are sometimes larger. Stamens 8, reduced to short staminodes in the female flowers, or absent. Fruit a blunt or acute 3-angled nut, enclosed in a more or less fleshy perianth.

Culture and Propagation.—Muehlenbeckias flourish in sandy loam, and are excellent plants for covering rocks, boulders, old tree stumps &c. in low masses. Their wiry stems lace and entwine so much that the small leaves become very close to each other, making a bright green carpet. They are increased by cuttings of the young or partially ripened shoots, which will root in an open shady border in sandy soil; but it is better, if possible, to put them in a cold frame. If not sufficiently well rooted for planting out about September, they are safer kept under cover until the following spring.

M. adpressa (*Polygonum adpressum*). A rambling, climbing Australian species with heart-shaped or broadly oblong blunt smooth leaves, ½–2 in. long, trilobed when young. Flowers in late summer, pink, small, numerous, in panicled spikes. Fruit a black triangular nut.

Culture and Propagation.—This species is often grown in greenhouses, but it will stand ordinary winters in favourable parts of the country. In severe weather a few branches of bracken will be a protection.

M. complexa.—A beautiful New Zealand rambler with wiry dull purple stems and alternate roundish leaves, ¼–½ in. across, slightly lobed at the base, and having a purplish edge in autumn. Flowers in September, small, dull white, numerous, in small clusters in the axils of the leaves. Stamens white, radiating from the centre, rather conspicuous.

This is perhaps the best species for rockeries, boulders &c., over which it forms charming masses. There seems to be a form called *varians*, with fiddle-shaped leaves.

Culture &c. as above.

XCVI. ARISTOLOCHIACEÆ—Birthwort Order

An order of erect or climbing herbs or shrubs, more or less fetid smelling when bruised. Leaves alternate, stalked, often heart-shaped, quite entire or 3–5-lobed. Stipules none. Flowers hermaphrodite, solitary or shortly cymose or racemose, axillary or terminal. Perianth peculiar in shape, attached to the base of the ovary, equally 3-lobed, or irregularly entire toothed or 3-lobed. Stamens 6 or more, attached round the top of the ovary or adhering to the stigmas. Ovary inferior, or rarely half superior. Fruit capsular or berry-like, 3–6-celled, many-seeded.

The order contains about 200 species, mostly natives of the tropics.

ASARUM.—A genus of perennial herbs with creeping rootstocks and long-stalked heart-shaped reniform or nearly hastate leaves. Flowers terminal, solitary, shortly stalked. Perianth adnate to the base of the ovary, rather hemispherical, broadly bell- or urn-shaped above the ovary, variously constricted or open at the throat, with 3 (rarely 4) equal valvate lobes. Stamens usually 12, attached to the ovary in two rows and sometimes slightly adnate to it. Ovary inferior or half-superior, hemispherical or roundish; styles 6 (rarely 4), thickish, free or more or less united in a column. Capsule leathery.

Culture and Propagation.—These curious perennials flourish at the base of the rockery or in borders or margins of shrubberies, in ordinary garden soil, and are interesting on account of their peculiar appearance and structure rather than for their beauty. They may be easily increased by dividing the roots in early spring.

A. canadense (*Canadian Snakeroot*). A Canadian species about 1 ft. high with broad kidney-shaped leaves in pairs. Flowers in May and June, brownish-purple, bell-shaped, on very short stalks, and sometimes half buried in the soil. The roots smell somewhat like Ginger.

Culture &c. as above.

A. caudatum.—A pretty Californian species having heart-shaped reniform hooded more or less acute and slightly downy leaves. Flowers in July, brownish-red, the 3 triangular lobes of the perianth being produced into rather long tails.

Culture &c. as above.

A. europæum (*Asarabacca*).—A British perennial about 1 ft. high, with a stout branched, woody, and fleshy creeping rootstock, and evergreen kidney-shaped leaves 2–3 in. long, having stalks 3–5 in.

long. Flowers in May, ½ in. across, greenish-purple, with incurved lobes.

Culture &c. as above.

A. virginicum.—A native of Virginia, about 9 in. high, with smooth, thick, leathery, bluntly heart-shaped leaves, the upper surface of which is mottled with white. Flowers in April and May, dark purple-brown.

Culture &c. as above.

ARISTOLOCHIA (BIRTHWORT; DUTCHMAN'S PIPE). — A genus of evergreen or deciduous climbing or erect shrubs with tuberous rootstocks and alternate, often stalked entire or 3–5-lobed leaves, often cordate at the base and 5–7-nerved. Peduncles axillary, 1-flowered, solitary, clustered, or shortly racemose. Perianth adnate to the base of the ovary, with a linear oblong or ovoid curved or straight tube, distinctly jointed above the ovary, expanding above into an oblique more or less spreading entire 1–2-lipped, 3-lobed, or 1–3-tailed limb. Stamens 6, rarely 4, or 10 or more, adhering to the stigma. Ovary inferior. Fruit a 6-valved many-seeded capsule.

Culture and Propagation. — This genus contains about 180 species, but most of those in cultivation require to be grown in hothouses. The kinds described below are suitable for the outdoor garden in ordinary good soil, and may be increased by seeds sown in spring in gentle heat, or by cuttings of the ripened shoots inserted in sandy soil under glass in a little heat in late summer and autumn.

A. Clematitis.—An herbaceous European perennial about 2 ft. high, now found naturalised in parts of England, and having broadly heart-shaped obtuse leaves 3–6 in. long, glaucous beneath. Flowers from June to September, 4–8 in a cluster, about 1 in. across, yellow, with a slender curved tube.

Culture &c. as above. May be grown in rough parts of the garden or rockery, among ruins &c.

A. elegans. — A beautiful Brazilian climber, with broad blunt ovate heart-shaped leaves on slender stalks. Flowers in August and September, solitary on long stalks; tube pale greenish-yellow, about 2 in. long, the broad heart-shaped limb 3–4 in. across, creamy yellow, heavily blotched with rich purple-brown and having a deep rich velvety crimson band around the throat.

Culture and Propagation. — This species since its introduction in 1883 has always been grown in greenhouses, but in 1899 I saw specimens which had flowered out of doors in a Surrey garden. This species seeds freely, and may be raised annually in early spring in heat. By June the young plants may be placed outside to cover a trellis, arbour, tree-stump &c., in warm sunny localities. It certainly ought to flourish out of doors as a tender annual in the south of England and Ireland, and if it will only do so, the outdoor garden will be enriched by the addition of one of the most beautiful of free-flowering climbers.

A. Sipho.—A North American climber with twining stems 15–30 ft. long, having heart-shaped acute leaves. Flowers in May and June, yellowish-brown, with a curved tube and a flat equally 3-lobed limb.

Culture &c. as above. Useful for covering walls, bowers, old tree-stumps, &c.

A. tomentosa.—Another N. American climber with heart-shaped leaves downy beneath. Flowers in July and August, purple; tube twisted back with a flat expanded yellow limb.

Culture &c. as above. May be used like *A. Sipho.*

XCVII. PIPERACEÆ—Pepper Order

An order of herbs, shrubs, or trees with alternate or rarely opposite or whorled, entire or very rarely 3-cleft, 3- or more nerved leaves. Flowers small, often minute, hermaphrodite or 1-sexed. Perianth, except in one genus, none. Stamens 2–6, or very rarely 7–8 or 1, hypogynous, usually with free filaments.

The Pepper of commerce yielded by *Piper nigrum* is an important economic plant requiring hothouse treatment. Many species of the genus Piper are pretty foliage plants, all requiring to be grown in heat.

SAURURUS (Lizard's Tail). — A genus of aquatic perennial herbs with alternate broad heart-shaped leaves having membranous stipules adnate to the stalk. Flowers hermaphrodite, small, numerous, in terminal racemes, each with a small bract. Perianth none. Stamens 6 or 8, or fewer by abortion. Carpels 3 or 4, distinct or cohering at the base.

Culture and Propagation.—Curious plants suitable for the bog garden or the edges of ponds or lakes in sandy loam. They may be increased by seeds sown in spring in swampy soil in pots half plunged in water, or by dividing the tufts at the same period.

S. cernuus (*American Swamp Lily*). A North American bog plant 1–2 ft. high, with heart-shaped taper-pointed leaves without distinct stipules. Flowers from June to August, white, in a dense spike 4–6 in. long, nodding at the top, bracts lance-shaped, filaments long and capillary.

Culture &c. as above.

S. Loureiri.—A native of Japan and the Philippine Islands, closely related to *S. cernuus*, from which it may be distinguished by its angular stems, short filaments, and spikes of flowers. *S. chinensis* is a variety scarcely distinguishable by its smaller and narrower leaves.

Culture &c. as above. This species is not so hardy as the preceding one, and may require a covering in severe winters over the crowns.

HOUTTUYNIA.—A genus with 2 or 3 species of perennial herbs with alternate broad or oblong leaves often cordate at the base. Stipules large, membranous, adnate to the base of the leaf-stalk or united into one. Flowers hermaphrodite, in dense terminal spikes, sessile between the sessile bracts. Perianth none. Stamens 6, rarely 8, or fewer by abortion. Ovary consisting of 3 or 4 united 1-celled carpels.

Culture and Propagation.—These may be grown as bog plants like the *Saururus* and are rather attractive in appearance. They will flourish in swampy sandy peaty soil and may be increased by seeds and division, the latter operation being best performed in spring.

H. californica (*Anemiopsis californica*). A Californian perennial with hairy stems and long-stalked somewhat bluntly heart-shaped leaves, nearly all radical. Flowers from June to August in erect conical spikes subtended by an involucre of about 6 oblong spreading white bracts, the inner 3 of which are spotted with red.

Culture &c. as above.

H. cordata (*Gymnotheca chinensis*). A distinct and interesting bog plant 8–9 inches high, with erect herbaceous purplish stalks. Leaves broadly heart-shaped, pointed, deep green, assuming a bronzy-purple hue with age, and strongly nerved beneath, the stalks furnished with 2 green oblong stipules. Flowers in July almost at the tips of the branches in erect cylindrical spikes, ½–1 in. high, with conspicuous golden stamens; at the base of the spike are 4 white oblong obovate petal-like bracts which by the uninitiated are likely to be regarded as the flowers proper.

Culture &c. as above. When in full blossom this is a pretty plant and looks well by the side of water.

XCVIII. LAURINEÆ—Bay Laurel Order

An order of more or less aromatic trees or shrubs with alternate or scattered, rarely opposite, leathery and evergreen, usually entire leaves; often dotted with pellucid glands. Stipules none. Flowers regular, hermaphrodite or polygamous or diœcious by abortion, arranged in sessile clusters, or in umbels or panicles. Perianth inferior, or rarely half superior and attached to the ovary, spreading bell-shaped, ovoid, or rarely oblong, normally 6-lobed, rarely

4-lobed. Stamens or staminodes usually twice as many as the perianth segments. Fruit a 1-celled, 1-seeded berry or drupe.

SASSAFRAS (Sassafras Tree).—A genus with only one species here described:—

S. officinale (*Laurus Sassafras*).—This is an ornamental deciduous tree 15–20 ft. high, native of the Eastern United States, with deeply furrowed rough aromatic bark. Leaves alternate, penniveined, ovate entire, or rather 3-lobed, very variable. Flowers diœcious, greenish-yellow, in short loose racemes. Perianth tube very short with 6 nearly equal segments. Stamens in the male flowers and staminodes often in the female ones 9 with 4-celled anthers.

Culture and Propagation. — This handsome tree flourishes in ordinary good garden soil, and may be increased by seeds, suckers, or root-cuttings. The cuttings should be put in sandy soil under a bell-glass and covered over; and will root more readily if placed in bottom heat. The suckers should have as many roots as possible and be planted in a shady border in autumn. In Virginia a beer is brewed from the young shoots, and oil is extracted from the fruits for perfumery.

UMBELLULARIA. — This genus also contains only one species:—

U. californica (*Ocotea californica; Oreodaphne californica*).—*Californian Sassafras* or *Bay Tree.*—This fine Californian tree, said to attain a height of 100 ft. in a wild state, is probably much better known in this country as *Oreodaphne californica*. Leaves alternate lance-shaped oblong, slightly narrowed at both ends, 2–5 in. long, remarkably reticulated and emitting a powerful and agreeable Camphor-like odour when bruised. Flowers in June, greenish-yellow, hermaphrodite, in solitary hoary pubescent or smooth umbels. Perianth tube very short, with 6 nearly equal segments. Stamens 9.

Culture and Propagation.—This tree grows only 6–20 ft. high in this country and cannot be considered hardy far north of the Thames Valley. It may be grown against a south wall in rich sandy loam, so that it obtains as much heat and shelter as possible. In the south of England and Ireland it should prove fairly hardy in ordinary winters. It may be increased by cuttings of the shoots in early summer in sandy soil under glass, kept close and shaded for a time. Also from seeds if obtainable. The leaves are said to be used for making 'Bay' water.

LAURUS (Bay Laurel).—A genus containing two species of evergreen trees with alternate penniveined leaves and diœcious or hermaphrodite flowers in clusters or short racemes. Perianth 4–6-lobed. Stamens in the male flowers 12 or more, all fertile, rarely 8; staminodes in female flowers often 4. Fruit an ovoid fleshy berry, surrounded by the persistent base of the perianth.

L. nobilis (*Victor's Laurel* or *Sweet Bay Tree*).—A well-known ornamental and aromatic evergreen tree or shrub 30–60 ft. high in its native state in S. Europe. Leaves oblong lance-shaped acute, veined, pleasantly scented, and having a somewhat bitter but aromatic taste. Flowers in early summer, yellowish, inconspicuous. There is a narrow-leaved variety called *angustifolia.*

Culture and Propagation.— This Victor's or Bay Laurel must not be confused with what is commonly known as the Cherry Laurel (*Prunus Lauro-Cerasus*) described at p. 360, or Portugal Laurel (*Prunus lusitanica*), p. 360. It is practically hardy in most parts of the country, although it is not infrequently cut down with severe frosts in bleak situations. For some reason or other it is not thought so much of by British as by Continental gardeners, and in this country is often seen smothered in shrubberies instead of being planted in groups or beds by itself, or as isolated specimens. It thrives in rich, sandy, well-drained loam, especially in warm places sheltered from bleak and biting winds. It may be increased in early summer by cuttings of the shoots inserted in sandy soil under a handlight, kept close and shaded for a short time until they have rooted. As may be seen from the botanical characters of the genus, the Sweet Bay may have either diœcious or hermaphrodite flowers. In the former case it is necessary to have the plant with female flowers fertilised by the pollen from an hermaphrodite or stamen-bearing plant before seeds can be produced.

XCIX. PROTEACEÆ—Protea Order

An order of shrubs and trees with alternate or scattered, rarely opposite or whorled leaves, entire, coarsely toothed, or sometimes on the same plant pinnately cut or decompound, very often leathery. Stipules none. Flowers axillary or racemose or in dense terminal spikes, hermaphrodite or polygamous or diœcious by abortion. Perianth inferior, 4- lobed or toothed. Stamens 4. Fruit dry and woody, 1-celled, 1- or more seeded.

GREVILLEA.—A genus of trees or shrubs with alternate scattered, variously shaped leaves. Flowers regular or irregular, hermaphrodite. Perianth tube slender and straight, or dilated at the base, and recurved below the oblique limb.

Culture and Propagation. — Only a few species are fit for outdoor cultivation, but they cannot be considered hardy even in mild winters, except in the mildest parts of the south coast. They flourish in sandy loam and peat, and are best grown in greenhouses from October to the end of May. There are about 160 species of Grevillea, and many of them would probably prove as hardy as those mentioned if tried.

G. robusta. — This is a popular and handsome plant, native of Australia, and by continually growing on from one year to another will reach a height of 5–10 ft. It has twice pinnate leaves with ovate smooth segments, whitish beneath. Flowers in June, orange, in panicled racemes.

Culture and Propagation.—It may be grown in pots from year to year, and from June to October it may be sunk into the lawn or the border and left to take care of itself, so long as it is not allowed to want for water during the hot summer months. In mild winters it will stand fairly well, or rather the tops will become injured and new shoots spring from the base. But once the main shoot is injured the graceful symmetry of the plant is spoiled. Easily raised from seeds sown in autumn or spring in gentle heat in sandy loam and peat. This species is grown chiefly for its graceful Fern-like appearance, and is a valuable plant for producing sub-tropical effects in the garden.

G. rosmarinifolia.—A pretty Australian bushy species about 4 ft. high, with linear Rosemary-like leaves and terminal clusters of red flowers in summer.

Culture &c. as above. This is hardier than *G. robusta*, and may be raised from seed or cuttings.

G. sulphurea. — This is the hardiest species of all, but even it is easily injured by frost. It is considered to be a variety of the Australian *G. juniperina*, an erect or spreading bush with linear rigid sharp-pointed Juniper-like leaves, and pale green or yellow flowers more or less tinged with red. The distinguishing feature of *sulphurea* chiefly lies in the absence of the red tint from the pale yellow flowers.

Culture &c. as above.

EMBOTHRIUM. — A small genus of ornamental evergreen shrubs with scattered leathery entire leaves, and slightly irregular hermaphrodite flowers in dense terminal racemes. Perianth-tube cylindrical, at length divided or cleft, and having an ovoid or globose, oblique or recurved limb. Fruit a stalked oblong leathery and rather woody folliculus.

E. coccineum (*Fire Bush*).—A beautiful shrub, native of the Andes, sometimes reaching a height of 20 ft. or more in the southern parts of the country. It has simple entire oblong leaves, and long drooping racemes of orange-scarlet flowers during the early summer months. Perianth cylindrical or tubular, with a roundish 4-cleft limb bearing the sessile anthers on the concave lobes.

Culture and Propagation.—The Embothrium succeeds best in a sandy peat, and may be increased by cuttings of the ripened shoots inserted in similar soil under a handlight, and kept close and shaded for a short time until rooted.

Except in the south of England and Ireland this fine plant cannot be considered hardy. Even in these favoured spots it has been injured severely by frost, and in other parts has not been touched by over 20° of frost in the same county. In the Thames Valley and around London three or four degrees of frost cause injury.

C. THYMELÆACEÆ—Mezereon Order

An order consisting chiefly of trees or shrubs, very rarely annual slender herbs, with a tough fibrous bark, and opposite or often alternate or scattered leaves, and no stipules. Flowers regular, hermaphrodite, or polygamous or diœcious by abortion, and borne in terminal or axillary spikes or heads. Perianth inferior tubular bell-shaped, with 4 or 5 more or less equal spreading lobes. Stamens twice as many as the perianth lobes. Ovary sessile or shortly stalked, entire, 1–2-celled. Fruit a nut, berry, or drupe.

This order contains about 360 species, only a few of which are of garden value.

DAPHNE.—A genus of erect or trailing shrubs with scattered, clustered, or distant persistent or deciduous leaves, and hermaphrodite fragrant flowers, in heads or very short racemes from the leaf-axils or the ends of the branches. Perianth tube cylindrical, often broader at the base, with 4 spreading lobes naked inside the throat. Stamens 8 in two rows, enclosed by the tube or the upper ones scarcely protruding. Ovary sessile or nearly so; style short or none, with a large capitate stigma. Fruit a more or less fleshy or leathery roundish ovoid or oblong berry.

Culture and Propagation. — The Daphnes are for the most part excellent spring-flowering shrubs and are suitable for the shrubbery, border, or rock garden, according to their natural habit of growth. They flourish in sandy loam enriched with decomposed manure or leaf soil, and when grown in masses or groups are very effective when in bloom.

They may be increased by layering the lower branches in summer. The old soil may be removed to a depth of 2 or 3 inches, and replaced by a fine sandy compost to within a couple of inches of the tops of the shoots. The following spring the compost should be carefully removed, the layers severed, potted into fine soil, and placed in cold frames until well established.

Cuttings of the ripened shoots or side growths will root in sandy peat in autumn under handlights or cold frames kept close and shaded for a time. If placed in pots, they can easily be moved into a warm greenhouse early in the new year, and the increased temperature will stimulate the formation of roots. The young plants may then be potted up singly and kept in the same temperature until established, after which as much light and air as possible should be given to harden them off.

Some of the more tender Daphnes are grafted on stocks of the hardier sorts, such as the Mezereon, and are often forced into flower a little earlier than usual by placing them in heat in early spring. When seeds are ripened they may be sown in sandy peat and loam in cold frames or in warm sheltered borders in autumn, and the seedlings may be transplanted the following spring or autumn if large enough The following is a list of the best kinds for the open air. *D. indica* is grown in greenhouses, and is greatly esteemed for the fragrance of its purple blossoms, which appear in early spring.

D. alpina.—A low branching shrub, about 2 ft. high, native of the European Alps. Leaves lance-shaped, bluntish, somewhat woolly beneath. Flowers from May to July, white, very fragrant, sessile, in terminal clusters.

Culture &c. as above. Suitable for the rock garden in light sandy peat loam and leaf soil.

D. altaica.—A Siberian shrub 1–3 ft. high, with obovate lance-shaped smooth leaves of a somewhat glaucous and yellowish green, especially when young. Flowers in April, white, scentless, sessile, about 5 in a terminal umbel.

Culture &c. as above. Rock garden or shrubbery.

D. blagayana.—A beautiful evergreen about 1 ft. high, native of the eastern European mountains, and having smooth alternate lance-shaped leaves. Flowers in April, white, fragrant, in dense terminal heads.

Culture and Propagation.—A good rock plant in well-drained sandy soil and leaf mould, surrounded by rocks and stones over which its branches may straggle. These branches may be pegged down and layered in spring, and either left until the following spring, or detached in autumn and potted up and kept in cold frames.

D. Cneorum (*Garland Flower*).—A beautiful trailing European species about 1 ft. high with smooth lance-shaped mucronate leaves about ½ in. long. Flowers in April and May, and again in September, bright pink or deep rose, sweet-scented, in large terminal clusters.

Culture and Propagation. — This is essentially a rock plant but may also be used with good effect in the front of borders or shrubberies. It flourishes in sandy peat, in not too dry a position, and takes a rather long time to develop into fine clumps. To be effective several plants should be placed near to each other. Increased by layers like *D. blagayana*.

D. Dauphini (*D. hybrida*).—A pretty evergreen Daphne of hybrid origin, its parents being *D. sericea* from S. Europe, and *D. odora* from China and Japan. The sweet-scented reddish-purple flowers are freely produced during the spring and summer months, and look handsome against the deep green foliage.

Culture &c. as above. This plant is fairly hardy, and will succeed in many parts of the kingdom against a south wall.

D. Genkwa.—A Japanese deciduous shrub 2–3 ft. high, having opposite lance-shaped leaves, and rather large clusters of fragrant lilac flowers in March and April before the leaves have developed.

Culture &c. as above. This species is hardy in the mildest parts of the kingdom, but may require a little protection in other parts in severe winters.

D. glomerata.—A dwarf Caucasian shrub somewhat resembling *D. blagayana*. The stems are leafless except at the tops, which are crowned by a rosette of bluntly oblanceolate leaves, among which the clusters or umbels of lilac-purple flowers appear in spring.

Culture &c. as above.

D. Gnidium.—A native of south-west Europe about 2 ft. high with linear lance-shaped evergreen leaves having a cuspidate tip. Flowers from June to August, pink, sweet-scented, in terminal panicled racemes.

Culture &c. as above.

D. Laureola (*Spurge Laurel*).—A distinct British and European evergreen shrub 3–4 feet high, characterised by having the branches leafy only towards the top. Leaves 2–5 in. long, leathery, obovate lance-shaped, acute, almost stalkless, and of a glossy shining green. Flowers from January to April, sweet-scented, yellowish-green, in drooping clusters from the upper leaf axils.

Culture and Propagation. — This species grows and flowers well under trees, but cannot be considered particularly handsome. Its ovoid black berries about ½ in. in diameter are very poisonous.

D. Mezereum (*Common Mezereon*).—A well-known British shrub 2–4 ft. high with deciduous obovate or spoon-shaped lanceolate acute stalked leaves 2–3 in. long. Flowers mostly in threes, and also in pairs and fours, from February to April, very fragrant, pink or red, appearing before the leaves, and succeeded by bright red ovoid berries ½ in. across. There is also a variety with white flowers, and others with double ones. In some seasons the flowers appear in autumn as well as in spring.

Culture and Propagation. — The Mezereon flourishes in ordinary soil in open sunny situations. Its acrid bark is much used in medicine. In favourable spots seedlings appear from self-sown seeds in spring, and may be transplanted in autumn.

D. oleoides. — An evergreen shrub about 3–4 ft. high, native of south-east Europe, and having obovate lance-shaped glossy green, bristle-tipped leaves. Flowers in April, white, in small terminal clusters surrounded by leaves. The variety *neapolitana* flowers even earlier than the type, from which it may be distinguished by the absence of hairs or down on the under surface of the leaves.

D. fioniana is a form of this, with a compact habit, dark green leaves, and purple-pink flowers, which are produced in June and often late in autumn.

Culture &c. as above.

D. petræa (*D. rupestris*). — *Rock Daphne.*—A Tyrolese shrub with handsome glossy green leaves and an abundance of pretty rosy flowers, produced in summer and autumn.

Culture &c. as above. It is well suited for the rock garden, and flourishes in peaty soil among limestone rocks.

D. pontica.—A fine evergreen shrub 4–5 ft. high, native of eastern Europe and Asia Minor. Leaves smooth, obovate, lance-shaped. Flowers in April and May, greenish - yellow, fragrant, in many-flowered upright clusters, two on a stalk. There is a very rare form having variegated leaves.

Culture &c. as above. This species, like *D. Laureola*, is excellent for shady spots under trees.

D. sericea (*D. collina*).—An erect evergreen Italian shrub 2–3 ft. high, with obovate leaves, smooth and shining green above, stiffly hairy beneath. Flowers from January to June, pinkish, in terminal clusters, and having a silky hairy calyx.

Culture &c. as above.

D. striata.—A European evergreen about 2 ft. high, forming dense twiggy bushes and characterised by stalkless somewhat spoon-shaped linear leaves. Flowers in June and July, rosy-purple, sweet-scented, in terminal clusters.

Culture &c. as above.

DIRCA (Leatherwood).—A genus with only two species of branching shrubs with alternate deciduous membranous leaves. Flowers hermaphrodite with a petal-like perianth, tubular at the base, contracted above the ovary, and having a truncate sinuate or very shortly 4-cleft non-spreading limb. Stamens eight, protruding. Ovary sessile, smooth; style thread-like, protruding. Fruit a naked berry.

D. palustris.—A much-branched North American shrub 2–5 ft. high, having the habit of a miniature tree, and bearing alternate lance-shaped oblong pale green leaves, hairy beneath. Flowers in March, before the leaves appear, yellowish, in terminal clusters, the protruding yellow stamens being conspicuous.

Culture and Propagation.—This distinct plant thrives in a moist cool peaty soil, and may be increased by layers like the Daphnes or by imported seeds.

CI. ELÆAGNACEÆ—Oleaster Order

An order consisting of trees or shrubs more or less covered with minute silvery or brownish scurfy scales. Leaves alternate or opposite, entire, penniveined, without stipules. Flowers hermaphrodite or 1-sexed and often diœcious, borne in axillary clusters, panicles, or catkins. Bracts small deciduous. Perianth in the hermaphrodite or female flowers tubular, constricted and persistent above the ovary, deciduous higher up, 2–4-lobed or rarely truncate. Stamens 4 alternating with the lobes, or 8 opposite and alternate. Staminodes in female flowers none. Ovary sessile at the base or the perianth, 1-celled. Style terminal, linear or dilated above, oblique, stigmatose on one side. Fruit superior, 1-celled, 1-seeded, enclosed in the perianth tube.

This order contains only the 3 genera described below, and about 20 species.

ELÆAGNUS (Oleaster; Wild Olive).—A genus of trees or shrubs often covered with silvery scales, and having opposite stalked entire leaves, and hermaphrodite flowers in clusters, or solitary in the axils of the leaves. Perianth bell- or salver-shaped. Stamens 4. Fruit a spurious drupe formed by the fleshy perianth tube enclosing a one-seeded nut.

Culture and Propagation.—The Oleasters flourish in ordinary good garden soil that is not too moist or in too shady a situation. They are not yet very well known, although some have been in cultivation for many years, and are beautiful shrubs. Increase is effected by means of seeds, cuttings, or layers, and sometimes by grafting. Cuttings of the half-ripened wood root in sandy soil in close shaded cold frames or under handlights about June and July.

E. angustifolia (*Jerusalem Willow*). A beautiful deciduous species allied to *E. hortensis*, native of south-east Europe, often attaining tree-like proportions with a trunk as much as a foot in diameter near the base. Leaves long lance-shaped, Willow-like, greyish-green above, silvery white beneath. Flowers in summer, tubular, yellow, produced in great profusion, and succeeded by silver-grey fruits which are sweet and pleasant to the taste, and abound in a dry mealy sugary substance.

Culture &c. as above. A good shrub for dry poor sandy soils. Increased by seeds, cuttings, and layers.

E. argentea (*E. canadensis*).—*Silver Berry* or *Missouri Silver Tree.*—A beautiful shrub, 8–10 ft. high, native of the upper Missouri valley, and recognised by its oval oblong wavy silvery-white leaves. Flowers in July and August, yellow, fragrant, tubular, in nodding axillary clusters, succeeded by roundish, silvery, ribbed, dry mealy edible fruits.

Culture &c. as above. This species is often confused with *Shepherdia argentea* described below (p. 781). It is sometimes injured by a few degrees of frost.

E. glabra (*E. reflexa*).—An evergreen Japanese shrub, 3–6 ft. high, with ovate oblong taper-pointed leaves, green and smooth above when old, and covered with rusty-red scales beneath. Flowers in autumn, whitish, almost solitary in the leaf axils. There is a form called *variegata* having the leaves irregularly margined with pale yellow.

Culture &c. as above. *E. glabra* grows freely in light sandy soil, and makes a fine compact bush in the course of two or three years.

E. hortensis.—A handsome deciduous tree native of south-east Europe, east Asia &c., growing 15–20 ft. high in a wild state, and having more or less spiny smooth brown branches. Leaves lance-shaped, 2–3 in. long, covered with hoary stellate hairs. Flowers in early summer, yellow, fragrant, solitary or 3–4 together, and succeeded by roundish edible fruit which is much prized by the inhabitants of its native country.

Culture &c. as above.

E. longipes (*E. edulis; E. crispa; E. odorata edulis; E. rotundifolia*).—An ornamental Japanese shrub, about 3 ft. high, with deep reddish-brown branches furnished with deciduous leathery leaves, dark green above, silvery-white beneath. Flowers in summer, succeeded in autumn by clusters of long-stalked, bright orange-red, juicy fruits, covered with minute white dots and having a sharp, rather pungent, and agreeable flavour. Pheasants, blackbirds &c. are very fond of the fruits and will soon strip a bush unless it is netted. It is a very hardy species, and is now called *E. multiflora.*

Culture &c. as above.

E. macrophylla.—A distinct evergreen bushy Japanese and Chinese species, about 6 ft. high in cultivation but said to attain tree-like proportions in a wild state. Leaves large, roundish ovate, about 3 in. long, smooth and greyish-green above, covered with silvery scales beneath. Flowers in autumn, greenish-yellow, in clusters. One of the peculiarities of this species consists in the leaves having the edge curled upwards, thus showing streaks of the silvery under surface.

Culture &c. as above.

E. pungens.—A pretty Japanese evergreen shrub about 6 ft. high, with spiny branches and oblong wavy leaves, smooth and greyish-green above, silvery beneath. Flowers late in summer, yellowish, one or two together in the leaf axils. The variety *variegata* is a handsome bush with leaves irregularly bordered with pale yellow. *E. Simoni tricolor* is a variegated form having the leaves bordered with dark green, the centres being greenish or golden-yellow, and *aurea* is a handsome shrub with brown young branches and leaves variegated with green and gold, the latter colour sometimes predominating.

Culture &c. as above.

E. umbellata (*E. parvifolia*).—A beautiful bushy shrub found in a wild state from the Himalayas to China and Japan. The leaves are deep green when old, but in a young state are silvery-grey above and white beneath; in mild districts they are persistent for one or more seasons, but in cold localities deciduous. The creamy white flowers appear in June in great profusion.

Culture &c. as above.

HIPPOPHAË (Sea Buckthorn; Sallow Thorn).—There is only one species belonging to this genus:—

H. rhamnoides.—This is a beautiful deciduous shrub 1-8 ft. high, found growing wild occasionally on the eastern sea-shores of England, and naturalised here and there in Scotland and Ireland. Branches ending in a spine, and bearing leaves ¼–2 in. long, lengthening after the flowers have withered to 3 in., dull green above, silvery-white beneath. Flowers in May on the old wood, the male ones minute in axillary clusters; the female flowers solitary, on separate plants. Perianth 2-parted. Stamens 4. Fruit ⅓ in. in diameter, enclosed in the roundish or oblong orange-yellow perianth tube. The Himalayan form *H. salicifolia* seems to be a geographical form of the Sea Buckthorn.

Culture and Propagation.—Although wild near the sandy seashores, and valuable as a cultivated plant in such localities, the Sea Buckthorn enjoys better treatment in good inland garden soil, and responds by forming beautiful silvery-white bushes studded with orange-yellow berries in September and October. As the male and female flowers are borne on separate plants, seeds in any quantity can only be obtained by having the pollen transferred by the wind or hand from the staminate to the pistillate flowers.

The Sea Buckthorn when fully established produces suckers freely, and by detaching these with as much root as possible the stock can be increased. Layers during the summer may also be made, and cuttings of the half-ripened shoots will root in cold frames during the summer months. Seeds may be sown as soon as ripe, or in spring in cold frames, and plants may also be obtained from cuttings of the roots.

SHEPHERDIA.—A genus containing 3 species of scaly shrubs or small trees, with opposite stalked oblong entire leaves. Flowers diœcious (*i.e.* male and female on different plants), small, very shortly spicate or racemose, opposite the small bracts at the side of the rachis. Perianth 4-parted. Stamens 8 in the male flowers, reduced to glands in the female flowers. Fruit-bearing perianth persistent at the base, berry-like.

Culture and Propagation.—The Shepherdias require the same treatment as the *Elæagnus* and *Hippophaë* described above. They are all natives of Canada and the N. United States.

S. argentea (*Buffalo Berry; Beef Suet Tree; Rabbit Berry*).—A rather tall shrub or small tree distinguished by its narrow elliptic tapering silvery-white leaves, and yellow flowers which appear in April, and are succeeded in due course by edible scarlet berries which have a pleasant acid taste. Only the pistillate or female flowers bear the berries, as in the case of the Sea Buckthorn. Although quite distinct, this species is often confused with the hermaphrodite flowered *Elæagnus argentea* (see above, p. 780).

Culture &c. as above. Increased by seeds, layers, suckers, or cuttings.

S. canadensis.—A shrub 3–6 ft. high with elliptic or ovate leaves, nearly naked and green above, and covered with a silvery down and rusty scurfy scales beneath. Flowers in May, yellowish, covered with rusty scales, and succeeded by orange-red insipid berries.

Culture &c. as above.

CII. LORANTHACEÆ—Mistletoe Order

An order of evergreen shrubs which depend for their existence on the elaborated sap of other dicotyledonous trees, into the bark and wood of which they strike their roots. They are very rarely erect trees or shrubs, growing in soil. Leaves opposite or rarely alternate, entire, often flat, thick, and leathery. Stipules none. Flowers regular, hermaphrodite, or 1-sexed. Perianth segments 3–6, rarely 2, with an equal number of stamens. Fruit a juicy inferior 1-celled 1-seeded berry.

VISCUM (Mistletoe).—A genus containing about 30 species of shrubs parasitic on trees, and having opposite or forked branches. Leaves sometimes flat and rather thick, and sometimes reduced to minute teeth or scales. Flowers diœcious or monœcious (that is, the staminate and pistillate flowers are separate, and may be borne either on the same (monœcious) or different (diœcious) plants). Perianth 3–4-parted in the female flowers, and adnate to the inferior ovary. Berry 1-seeded, naked or crowned with the perianth lobes.

V. album (*Common Mistletoe*). — A well-known British parasitic shrub forming smooth yellow-green masses of roundish forked and knotted stems, bearing obovate lance-shaped leaves 1–3 in. long. Flowers from March to May, green, inconspicuous, succeeded by ovoid or roundish semi-transparent berries filled with a sticky juice and ripe at Christmas time.

As a garden plant, the Mistletoe scarcely deserves a place in this work at all, as it has no particular beauty to recommend it. The sentiment attaching to its use at Christmas time, however, renders it at least one of the very best known plants in the kingdom. Tons of it are sent to Covent Garden Market every season, and for a brief period and special purposes good prices are realised.

The Mistletoe is found growing more frequently perhaps on the Apple tree than any other, although Druid legends always associate it with the Oak. It is also found on Poplars (except the Lombardy one), Limes, Hawthorns, Maples, Mountain Ash, Cedars, Oaks, and several other trees, including the Peach, the Hop Hornbeam (*Ostrya*), and the False Acacia.

Culture and Propagation.—The seed may be carefully inserted in a slit cut in the bark. The slimy juice around the seed helps it to stick in the slit, but unless protected with a little canvas or other covering for a short time, birds are very apt to discover its whereabouts and purloin it. Care should be taken not to crush the seed when placing it inside the bark.

CIII. EUPHORBIACEÆ—Spurgewort Order

A very large order of trees, shrubs, and herbs, annual and perennial, remarkable for their thick milky and often poisonous juice. Leaves various, alternate or opposite, undivided, entire, toothed or lobed. Flowers 1-sexed, monœcious or diœcious, usually regular and minute. Perianth often small, sometimes none, or 2–5-lobed. Stamens various in number, 1 or more, sometimes very numerous. Ovary 2–3-lobed; styles 2–3, with entire or lobed stigmas. Fruit capsular, 2–3-celled; cells 1–2-seeded.

This extensive order contains about 3,000 species, mostly natives of tropical countries, and the above characteristics apply more particularly to the plants described in this work.

EUPHORBIA.—A genus of annual or perennial herbs, undershrubs or shrubs with milky acrid juice. Leaves alternate or opposite, undivided, entire or rarely toothed. Flowers with involucres, arranged in terminal cymes, or in the axils of the leaves, or in dichotomous cymes or racemes. Involucre calyx-like, regular or scarcely oblique, bell-shaped or turbinate, with 4–5, rarely 6–8, entire or lacerated lobes. Perianth none, but represented by the involucral lobes. Male flowers several in each involucre, each having 1 stamen on a jointed stalk. Female flower naked on an elongating stalk and protruding from the centre of the involucre. Ovary sessile on the top of the stalk, 3-celled, with 3 more or less distinct or united styles.

Over 600 species belong to this genus, but very few of them are of value for the hardy flower garden, although several are grown in greenhouses, the best known being *E. fulgens* (or *jacquiniæflora*), *E. splendens*, and *E. pulcherrima*—the latter better known as Poinsettia, and remarkable for its large scarlet leaf-like bracts.

E. corollata. — A rare and pretty species 12–24 in. high, with erect, slender green and purplish stems sparingly furnished with alternate stalkless, oblong blunt leaves 1½–2 in. long, the upper floral ones opposite and smaller, somewhat glaucous and tinged with reddish-brown. Flowers terminal, the branches at first being 3-forked, each one afterwards 2-forked, and bearing at the top 1-3 flowers, the chief beauty of which lies in the 5 white starry oblong obovate bracts, less than ½ in. across, in the centre of which the stalked female flowers are distinctly protruding. There is a superior and somewhat dwarfer variety, having rather broader leaves and denser heads of flowers, owing to the white bracts being almost round or broadly obovate and touching each other. It might be called *compacta*.

Culture and Propagation.—This seems to be a new garden plant. It flowered for the first time in August 1899 in the garden of Sir Trevor Lawrence, Bart., at Burford, Dorking. It was raised from seed sown in spring, and seems to be a hardy perennial, thriving in ordinary garden soil. If grown in large masses it would look very fine, the white bracts which are the chief charm of the plant reminding one very much of the flowers of *Spiræa media*.

E. Cyparissias (*Cypress Spurge*).—A distinct and handsome European perennial 1–2 ft. high, easily recognised by its linear entire deep green leaves crowded on the stems. Flowers in early summer, yellow, produced in umbels and supported by about 20 heart-shaped involucral bracts, often yellow in colour.

Culture and Propagation. — This species flourishes in ordinary good and well-drained garden soil, and is useful for borders, banks, margins of shrubberies or roughish parts of the garden in exposed sunny spots. It may be increased by seed sown in cold frames when ripe, and also by division in spring.

E. Lathyris (*Caper Spurge*). — A British biennial 3–4 ft. high with 4-ranked linear oblong glaucous stalkless leaves 2–8 in. long, broader at the base. Flowers in June and July, surrounded by ovate lance-shaped acute bracts.

Culture &c. as above. Suitable for rough places. Increased by seeds.

E. Myrsinites. — A pretty trailing species, native of S. Europe, with fleshy concave, pale sea-green, stalkless leaves. Flowers in summer, 5–9 in an umbel surrounded by an involucre of ovate acute bracts.

Culture &c. as above for *E. Cyparissias.* Borders or rockery. Increased by seed.

E. portlandica. — Another British species with a cylindric perennial rootstock and leathery oblong obovate leaves ½–¾ in. long, borne on coloured stems 6–18 in. high. Flowers from May to August, surrounded by broadly heart-shaped bracts.

Culture &c. as above. Increased by division or seed. Suitable for wild or rough parts of the garden.

E. variegata (*E. marginata*). — A United States annual 18–24 in. high, with whitish forked stems and alternate stalked entire oval leaves, the lower ones green, the upper ones traversed by whitish nerves. The floral leaves white with a green line on each side of the midrib. Flowers inconspicuous, surrounded by a milky white or greenish involucre.

E. heterophylla is another N. American annual with somewhat fiddle-shaped leaves, and red floral leaves or bracts.

Culture &c. as above. Chiefly valuable for the variegation of the leaves and bracts. Seeds may be sown in the open border in April and May.

BUXUS (Box).—A genus of smooth branching shrubs or small trees with opposite shortly stalked entire leathery evergreen leaves, without stipules. Flowers monœcious in axillary clusters or spikes, green. Perianth of 4 segments in the male, and 6 segments in the female flowers. Stamens 4. Capsule ovoid, leathery, crowned with the 3-horned or beaked styles.

B. balearica (*Minorca Box*).—A handsome tree 15–20 ft. high, native of the Mediterranean region, with oblong elliptic yellowish-green leathery leaves about 2 in. long, slightly notched at the margin, and having cartilaginous edges.

Culture and Propagation. — This species thrives only in warm light soils, and in parts of S.E. Europe is said to attain a height of 80 ft. In some parts of the country it will stand a few degrees of frost without injury, but in other parts 2 or 3 degrees are sufficient to prove its tenderness. It may be increased by cuttings and layers in the same way as the Common Box. The cuttings, however, should be protected in winter.

B. sempervirens (*Common Box*).—A beautiful and well-known evergreen shrub or small tree 8–14 ft. high, and a true native of the chalky hills of Kent, Surrey, Bucks, and Gloucester. Leaves ½–1 in. long, oblong blunt or retuse, deep shining green and leathery in texture. Flowers in April and May, inconspicuous.

There are several varieties of the Common Box, the best known being *argentea* and *aurea*, having the leaves variegated with silver and gold respectively; *marginata*, leaves edged with yellow; *myrtifolia*, a robust form with oblong, rather narrow Myrtle-like leaves; *obcordata variegata*, a Japanese form with obcordate variegated leaves; *Japonica* is a variable plant from Japan, but quite hardy; *rosmarinifolia* is a dwarf bush with slender leaves and branches; *suffruticosa* the very dwarf dense form, usually employed for Box edgings; and several others with nurserymen's names, supposed to describe the peculiarity of each.

Owing to its dense habit and deep green masses of foliage, the Common Box has always been a favourite in English gardens. It stands clipping well, and for this reason was at one time hacked about into all sorts of fantastic shapes, in conformity with the style known as 'topiary' gardening. To see it at its best, the Common Box should be grown in exposed sunny situations away from trees, and might very well be used to crest small hills or mounds. As a commercial plant the Box is very valuable, on account of its beautiful pale yellow wood which is heavier than that of any other European tree, and is the only European wood that sinks in water.

Culture and Propagation.—The Common Box is increased by cuttings, layers, suckers, and division. Cuttings about 4–6 in. long are inserted in fine sandy soil in shady places under lights in August and September, and soon develop roots. Layers of the lower branches made in autumn or spring also produce good plants, and suckers may be detached in early autumn and transplanted in fine soil. The variety *suffruticosa*, so much used as an edging, is usually increased by division. The separated portions should be firmly planted. Cuttings may also be made in the ordinary way.

DAPHNIPHYLLUM. — A genus containing about 11 species of smooth trees or shrubs with alternate stalked, entire, leathery feather-veined leaves. Male and female flowers borne on separate plants (diœcious) and without petals. Calyx segments in the male flowers 3–8, small. Stamens numerous (5–8) with short free filaments. Ovary rudimentary or none, but in the female flowers almost perfectly 2-celled, with distinct thickish, recurved-spreading styles. Fruit an indehiscent Olive-like drupe, very often only 1-seeded by abortion.

D. glaucescens (*D. macropodum*).—An ornamental Rhododendron-like shrub, 3–4 ft. high, native of China and Japan. Its young branches are roundish, and shining green, clothed with alternate oblong lance-shaped acute leaves 3–6 in. long, having a purple-red stalk 1½–2 in. long. The upper surface of the leaves is of a deep shining-green like that of the Cherry Laurel, but the under surface is covered with a beautiful bluish-white bloom.

Culture and Propagation. — This shrub flourishes in ordinary good and well-drained garden soil, and is more valuable as a decorative plant, on account of its appearance and foliage, than for its flowers. It makes a neat rounded bush, and may be increased by layers in autumn, or by cuttings of the more or less ripened shoots inserted in sandy soil in cold frames in late summer and autumn, and protected until the following spring.

RICINUS (Castor Oil Plant; Palma Christi).—A genus with only one species:—

R. communis.—An ornamental herb 3–5 ft. high or more, having greenish or purplish stems and large handsome peltate leaves palmately cut into 7 or 8 serrated lobes. Flowers in summer, monœcious and without petals, borne in terminal spikes. Calyx or perianth 3–5-parted. Male flowers (the upper ones) have numerous stamens in separated bundles. Fruit usually a 3-celled 3-seeded prickly capsule.

There are several varieties of Castor Oil plants, the best known being *borboniensis*, *Duchess of Edinburgh*, with dark purple stems and leaves; *Gibsoni*, with deep bronzy foliage; *macrophyllus giganteus*, with very large leaves; *major*, *minor*, *insignis*, *africanus*, *atropurpureus*, *sanguineus*, *viridis*, *zanzibarensis*, &c., all more or less distinct and ornamental.

Culture and Propagation.—The Castor Oil plant is probably a native of tropical Africa, and although really a perennial it is treated as a tender annual for outdoor gardening purposes. It flourishes in rich loamy soil, and is easily raised from seeds. These are best grown singly in small pots and plunged in heat about February or March. They soon germinate, and should be shifted on as quickly as possible to larger-sized pots until about the first or second week in May. They should then be placed in a cooler temperature, and more air may be gradually given to harden them off well previous to planting them out about the middle or end of June, according to the season.

Grown in beds or masses by themselves, Castor Oil plants lend a luxuriant and subtropical aspect to the flower garden. In warm sheltered situations and favourable seasons they usually attain grand proportions, spreading out their beautiful palmate leaves as if to absorb as much sunshine as possible. For this reason it is not well to place dwarfer plants beneath them, as the shade would be much too dense. In hot dry summers the surface of the soil may be mulched with manure, and copious waterings should be given during the evenings if the full beauty of the plants is to be developed.

It may be mentioned here that the plant very often called 'Castor Oil Plant' belongs to a quite distinct group. It is known as *Fatsia japonica* (or *Aralia Sieboldi*), and is described at p. 471.

CIV. URTICACEÆ—Nettle Tree Order

An order of trees, shrubs, or herbs, various in habit. Leaves alternate or rarely opposite, entire, toothed, lobed or palmately parted, never pinnate, and very rarely pinnately divided. Flowers 1-sexed or rarely polygamous, regular, or irregular by reduction in axillary clusters. Perianth simple, calyx-like, 4-9-lobed. Stamens 4-9, filaments adnate to the perianth. Fruit superior, 1-3-celled, indehiscent, drupe-like or membranous, and often furnished with a circular wing.

The Common Stinging Nettle is probably the best-known member of this order. The India-rubber Plant (*Ficus elastica*) also belongs to it, and is often placed in the open air during the milder months of the year, but is in no sense hardy. The Common Fig (*Ficus Carica*), although sometimes grown as a standard bush in the south, usually requires the protection of a south wall, and apart from its fruit-bearing properties may be regarded as an ornamental plant for covering walls. Its cultivation is more fully dealt with at p. 1096.

ULMUS (ELM).—A genus of unarmed trees with alternate distichous serrate penniveined leaves, deciduous or subperennial, with scarious very caducous stipules. Flowers polygamous, mostly hermaphrodite, in clusters at the leafless joints or in the leaf axils. Perianth bell-shaped, 4-8- (often 5-) cleft. Stamens 4-8 (often 5), at length protruding. Fruit flat, dry, obliquely ovate, with a membranous circular veined wing.

Culture and Propagation.—The Elms are well-known ornamental trees. They flourish in rich loamy soil, and may be regarded as gross feeders. They are increased by seeds, which should be sown as soon as ripe in spring or early summer. Layering is also employed, in the case of choice varieties, during the autumn, the plants being ready for separation the following year. Where suckers shoot up they may also be used for purposes of increase. Grafting is practised, with choice varieties, in spring, as close to the root as possible, so as to avoid the development of suckers from the stock afterwards. A good deal of confusion exists in regard to the names of Elms, and forms of *campestris*, *glabra*, and *montana* have been mixed up considerably. Many of the kinds are remarkable for the beautiful autumnal colouring of the foliage.

U. alata (*Winged Elm*).—A N. American tree 30–40 ft. high, with sometimes corky winged branches. Leaves 1–2½ in. long, ovate-oblong or oblong lance-shaped, thickish, more or less smooth above, downy beneath. Flowers on slender drooping jointed stalks with obovate segments. Fruit ovate, more or less downy, fringed.

Culture &c. as above.

U. americana (*American* or *White Elm*).—An ornamental N. American tree 80–100 ft. high. Leaves 2–4 in. long, obovate-oblong or oval, abruptly acute, sharply and often doubly serrate, smoothish above, more or less downy beneath. Flowers drooping, with a 7-9-lobed perianth. Fruit oval, about ½ in. long. There is a 'weeping' or drooping form called *pendula*.

Culture &c. as above.

U. campestris (*Common Elm; Alme; Aume Tree*).—A fine and well-known British tree about 125 ft. high when full grown, the rugged trunk often attaining a girth of more than 20 ft., the roots sending up an abundance of suckers. Leaves 2–3 in. long, ovate-oblong, somewhat cuspidate. Flowers with 4 stamens. Fruit usually obovate.

There are several varieties of this species, the most ornamental being perhaps the pretty Variegated Elm, which has the leaves striped and blotched with white, and is very ornamental in spring. The variety *stricta* is distinguished by its rigid, erect growth; *tortuosa*, the Twisted Elm, is a peculiar form; and *virens*, the Kidbrook Elm, is almost evergreen in winter, and therefore valuable. Other forms are *acutifolia*, *Berardi*, *betulæfolia*, *latifolia aurea*, *l. argentea*, *myrtifolia* (or *buxifolia*), &c.

Culture &c. as above.

U. fulva (*Slippery* or *Red Elm*).—A N. American tree with ovate-oblong taper-pointed doubly serrate leaves 4–8 in. long, very rough above, softly downy beneath, and sweet-scented when drying. Flowers nearly sessile, with 7–9 perianth segments and stamens. Fruit roundish. There is a weeping form called *pendula*. The seeds of this species do not sprout until the following year, and should be stratified in layers of wet sand until they are sown.

Culture &c. as above.

U. glabra (*Wych Elm*).—Botanically this is only a form of the Common Elm. It grows 60–80 ft. high, and has elliptic-oblong doubly serrate smooth leaves, very unequal at the base. Flowers nearly sessile, 5-cleft. Fruit obovate, deeply cleft, rather small. There are several forms, including *pendula*, a 'weeping' variety known as the Downton Elm; *variegata*, with variegated leaves.

Culture &c. as above.

U. montana (*Scotch* or *Wych Elm*).—A British and European tree 80–120 ft. high with long spreading branches and large ovate-oblong doubly and trebly serrate taper-pointed leaves 3–6 in. long. Flowers 5–7-parted. Fruit oblong or roundish, slightly cleft.

There are several distinct and handsome varieties, among which may be mentioned *crispa* (or *urticæfolia*), with crisped thickly plaited and wrinkled irregularly toothed leaves, habit dwarf and slender; *fastigiata*, the Exeter or Ford's Elm, a remarkable pyramidal form with leaves peculiarly twisted; there is also a golden-leaved form of it called *fastigiata aurea*; *nigra*, the Black Irish Elm, a more spreading tree than the type; *pendula* is a beautiful form with branches spreading fanlike, sometimes horizontally, sometimes perpendicularly, and a variegated form called *pendula variegata*, the leaves of which are mottled with white, and *vegeta*, the Chichester or Huntingdon Elm, a very vigorous kind, often attaining a height of 30 ft. in about 10 years when grafted. *Cornubiensis*, the 'Cornish Elm,' has small leathery strongly veined leaves and bright brown branches. It comes into leaf somewhat later than the Common Elm.

Other Elms worthy of mention are *parviflora*, from China and Japan, *pedunculata* (or *effusa*), a European tree 50–60 ft. high, and *suberosa*, the Cork-barked Elm, really a variety of *campestris*. It grows 60–100 ft. high, and has a form with beautifully variegated leaves.

Culture &c. as above.

ZELKOVA.—A small genus of deciduous ornamental hardy trees with alternate, sessile or very shortly stalked, serrate or crenate, feather-veined leaves. Flowers monœcious or polygamous, almost stalkless, and borne on the current year's shoots. Perianth of the male flowers broadly bell-shaped with a sinuate or somewhat 4–5-lobed margin. Stamens 4–5. Perianth of the female flowers more or less deeply lobed as in the male ones. Staminodes none, or very rarely perfect stamens. Ovary sessile with a 2-parted style. Fruit an irregularly oblique roundish or keeled drupe-like capsule.

Culture and Propagation. — These trees are but little known, and are cultivated in few gardens in the British Islands outside Kew, where specimens may be seen. Like the Oak, Beech, Elm, and other large trees, they are suitable only for large parks and pleasure grounds. They like deep rich well-drained soil, and would flourish in the milder parts of the kingdom. As seeds are rarely ripened, propagation must be effected by means of layering the branches in autumn, and detaching the following year when well rooted. They may also be grafted on stocks of the common Elm, to which, as may be seen by their juxtaposition in this work, they are closely related.

Z. acuminata (*Planera acuminata*). A small Japanese tree with reddish bark and oval-elliptic leaves often much tapering at the apex, 2–4 in. long, strongly veined, and regularly toothed on the margins.

Culture &c. as above.

Z. crenata (*Planera crenata*).—*Siberian Elm.*—A large ornamental tree, 80–100 ft. high; native of the Caucasus, with oval lance-shaped leathery leaves 3–4 in. long, coarsely crenate on the margins, and deeply feather-veined. The greenish strong-scented flowers appear about April and May in clusters in the upper leaf axils.

Culture &c. as above. I remember seeing some fine specimens of this tree in the Trianon Park, Versailles, in 1897, and perhaps some of the finest trees in the British Islands are along the banks of the Cherwell near Christchurch meadows, Oxford, where there are two specimens 60–70 ft. high, with trunks about 4 ft. in diameter a few feet from the ground.

CELTIS (Nettle Tree).—A genus of unarmed or spiny trees and shrubs with alternate annual or perennial serrate or entire leaves, feather-veined and 3–5-nerved, often oblique at the base and with free stipules. Flowers polygamous or hermaphrodite, greenish. Perianth more or less 5-parted, rarely 4-parted. Stamens 5, rarely 4. Fruit a 1-seeded fleshy ovoid or roundish drupe, sometimes 2-keeled.

Culture and Propagation. — The Nettle Trees are useful for the back part of large shrubberies, and flourish in ordinary good loamy well-drained soil. They are increased by seeds sown as soon as ripe, and by layers during the summer and autumn months. Cuttings of the ripened shoots will also root in sandy soil under handlights in autumn.

The following are a few of the best-known species:—

C. australis.—A South European tree 30–40 ft. high with ovate or oblong lance-shaped sharply serrate leaves, rough above, downy beneath. It has black edible fruit.

Culture &c. as above.

C. davidiana. — A much-branched Chinese tree with drooping twiggy branches and thick leathery elliptic irregularly toothed leaves, deep glaucous-green above, paler beneath.

Culture &c. as above.

C. occidentalis (*C. crassifolia; C. cordata*).—*American Hackberry.*—A Canadian tree 30–50 ft. high with variable ovate taper-pointed serrate leaves, unequal at the base, rough above, hairy beneath. Flowers in May, greenish. This is rather an ornamental tree for grass-land in parks and large gardens. A fine specimen may be seen near the main gate entrance in Kew Gardens. The variety *pumila* rarely exceeds 8 ft. in height.

Culture &c. as above.

C. Tourneforti. — A Caucasian tree or shrub 10–12 ft. high, with more or less heart-shaped oval pointed leaves unequal at the base, and toothed or crenulate on the margins. The greenish flowers are succeeded by brownish-yellow ovoid fruits about the size of a large pea.

Culture &c. as above.

HUMULUS (Hop Plant).—A genus containing two species of high-climbing rough-haired perennial herbs with opposite, stalked, broad, serrate, heart-shaped or palmate, 5–7-nerved leaves. Flowers diœcious, drooping, the male ones in panicles with a 5-parted perianth, the female ones in spikes. Stamens 5. Fruit a broadly ovate flattish achene enclosed in the perianth segment.

Culture and Propagation.—The Hop is a beautiful and vigorous climber, well adapted for covering trellises, arbours &c. during the summer months. It flourishes in a rich deep loam, and prefers open sunny situations to dark shady ones. Increased by seeds sown in heat in spring or by division of the rootstock.

H. japonicus (*Japanese Hop*).—An annual species, native of N. Japan, with vigorous climbing stems heavily covered with roughish hairs. The stems often attain a length of 15-20 ft., and are furnished with broadly oval or rounded leaves, cut more or less deeply into 5-7 crenulate toothed lobes, somewhat larger than those of the Common Hop and paler in colour beneath. The male flowers are in branched few-flowered panicles; the female ones are borne in the axils of the deltoid pointed bracts, the union of which with the perianth segments forms a roundish or ovoid spike. Fruits (achenes) shining and yellowish.

There is a beautiful variety of this species having the green leaves blotched and streaked with pale and deep yellow. It is called *japonicus foliis variegatis*.

Culture and Propagation.—This is not quite so hardy as our native Hop, and should be grown in warm sheltered spots. It may be raised like other tender annuals, by sowing seeds in March in heat and growing the young plants on to be fit for planting out at the end of May. In warm localities the seed, when ripe, will sow itself, remaining in the ground uninjured during the winter and producing vigorous plants in spring.

H. Lupulus (*Common Hop*).—A vigorous climber, native of the north temperate hemisphere, with rough angular branching stems and opposite stalked heart-shaped serrate leaves, deeply veined and roughish to the touch. Flowers in summer, greenish-yellow; male ones in loose axillary panicles; female ones shortly stalked in roundish heads or spikes. There are several varieties.

Culture and Propagation.—The Common Hop is a very useful plant for clambering over hedges, trellises, &c. It may be increased by seed sown when ripe in warm sheltered spots in the open air or in cold frames; or by division of the rootstocks in early autumn when the leaves are browning, or in spring. The flower spikes of this species are used for brewing, and acres of the plant are cultivated in the south-eastern counties of England.

CANNABIS (Hemp).—A genus containing only the following species:—

C. sativa.—A vigorous Indian annual, often 4–10 ft. high in the British Islands, but much taller in Italy and other parts of S. Europe. It has alternate or, at the very base, opposite stalked leaves, palmately divided into 5–11 lance-shaped acute serrate segments. Flowers in June, greenish, inconspicuous, diœcious, the male ones shortly paniculate, and having 5 distinct segments, the female ones clustered between the sessile bracts. Stamens 5. Achene flattish, within the perianth.

Culture and Propagation.—The Hemp plant flourishes in ordinary garden soil, and comes up freely from seeds sown in the open border in April and May. It is of far more value as an article of commerce (the stems yielding hemp) than as a garden plant. Still, when grown in rich soil with plenty of room to develop, it is by no means ungraceful, and gives a somewhat tropical aspect to the garden.

BROUSSONETIA (Paper Mulberry).—A genus containing two or three species of milky trees with alternate stalked slightly wrinkled and softly hairy undivided or 3–5-lobed leaves with lateral deciduous stipules. Flowers diœcious, the male ones in cylindrical spikes and having a 4-parted perianth, the female ones in roundish heads with an ovoid or tubular 3–4-toothed perianth. Stamens 4.

B. papyrifera.—An ornamental Chinese shrub or small tree 10–20 ft. high, with large lobed or entire hairy leaves and greenish flowers in May, as above described. There are several forms, differing chiefly in the shape of the leaves, one called variously *laciniata*, *dissecta*, or *heterophylla* in gardens, having the leaves very much divided.

Culture and Propagation.—In Northern parts this plant requires protection in severe winters, but in the South it seems to be practically hardy in warm sheltered positions. It flourishes in rich loamy soil well enriched with manure, and may be increased by suckers and cuttings of the ripened shoots inserted in sandy soil under handlights or in greenhouses in autumn. Seeds may also be sown when ripe in cold frames.

MORUS (MULBERRY).—A genus with 10–12 species of milky-juiced trees or shrubs having alternate toothed entire or 3-lobed leaves and small caducous lateral stipules. Flowers monœcious or diœcious (the male and female on separate spikes, sometimes one kind only on a tree, sometimes another). Perianth segments 4. Stamens 4. Fruit composed of numerous egg-shaped flattened achenes covered by the enlarged juicy and fleshy perianths.

Culture and Propagation.—The kinds mentioned below flourish in rich loamy soil, and may be regarded as ornamental in parks and large gardens. They may be increased by cuttings of the young shoots in spring, or the ripened ones in autumn, inserted in sandy soil under handlights. Other details as to general cultivation are given under 'Mulberry' in the Fruit portion of this work (p. 1100).

M. alba (*White Mulberry*).—A Chinese tree 20–30 ft. high, with heart-shaped or ovate, divided or lobed, unequally serrate or toothed glossy green leaves with a deep notch or sinus at the base. Flowers in May, greenish-white, succeeded by white or pale red fruits, ripe in September and not so agreeable in flavour as those of *M. nigra.* There are several forms of this species grown in S. Europe chiefly for the leaves, which are used for feeding silkworms.

Culture &c. as above.

M. nigra (*Common Black Mulberry*). A beautiful oriental tree 20–30 ft. high, with large bluntly heart-shaped or slightly lobed and unequally toothed roughish leaves. Flowers in June, greenish-white, followed by oblong deep red or black fruits ripe in August and September, and very refreshing and palatable.

Culture &c. as above.

M. rubra.—A tree 40–70 ft. high, native of the United States (the lower Missouri Valley), having heart-shaped ovate pointed leaves in outline, 3-lobed or palmate, evenly serrate, roughish and rather hairy above, soft and very downy beneath. Flowers in July, greenish-yellow, succeeded by long red agreeably flavoured fruits, ripe in September. This species is hardier than either the White or Black Mulberry, and produces a strong fine-grained wood.

Culture &c. as above.

CV. PLATANACEÆ—Plane Tree Order

An order of highly ornamental deciduous trees, the bark of which peels off in flakes annually. Leaves long-stalked, alternate, palmately nerved and lobed, and furnished with conspicuous sheathing stipules. Flowers monœcious, without a perianth, and clustered in separate naked globose heads or catkins on long drooping stalks. Each male flower has one stamen. Carpels in the female flowers numerous, distinct, intermixed with the linear, or short bracts. Fruit a 1–2-seeded nut or achene, several arranged in dense heads.

PLATANUS (PLANE TREE).—This is the only genus in the order, and as its essential characters are given above it is unnecessary to repeat them.

Culture and Propagation. — The species described below are among the most ornamental and useful trees in cultivation. They flourish in a deep rich loamy soil, and attain their finest proportions near water. What is commonly and erroneously called the Plane Tree in Scotland is equally erroneously called the Sycamore in England. The tree referred to by these names is really a Maple (*Acer pseudo-platanus*) described at p. 317. Plane trees are increased by seeds, which may be sown as soon as thoroughly ripe in warm borders. Layers may also be made where the branches conveniently admit. Cuttings of the ripe wood inserted in moist sandy soil under handlights or cold frames in autumn will also root, and should be protected from frost until spring.

P. occidentalis (*Button Wood; Western* or *American Plane Tree*).—A fine tree 70–80 ft. high, native of the United States, with 5-angled slightly lobed toothed leaves, wedge-shaped at the base, downy beneath. Flowers in May, greenish, succeeded by brownish fruits ripe in October and November.

This is said to be the largest deciduous tree in the United States, where it abounds on the banks of the great rivers. There is, or was, a specimen in the grounds of Chelsea Hospital, near the banks of the Thames, about 115 ft. high, with a trunk 5 ft. in diameter.

Culture &c. as above.

P. orientalis (*Oriental* or *Common Plane*).—A splendid ornamental shade tree 60–80 ft. high, native of S.E. Europe, Asia Minor &c., and characterised by its shining green leathery palmately 5-lobed leaves, with lance-shaped coarsely toothed divisions. Flowers in April, greenish-yellow, succeeded by brown prickly roundish fruits, ripe in October, and hanging on the tree well into spring and even summer.

The London Plane tree is a variety called *acerifolia*, on account of its Maple-like leaves. It is often confused with the American Plane, but may be easily recognised when in fruit by having more than one cluster of fruits hanging on the stalks. The variety *cuneata* has the leaves distinctly wedge-shaped at the base; *laciniata* has them deeply divided; and *variegata* is a handsome but rather rare form, easily recognised by having its leaves blotched and streaked with white and pale green.

Culture &c. as above. The Common Plane is an excellent tree for smoky towns, the soot and grime and dust apparently having no injurious effects on its smooth leathery leaves. Along the Thames Embankment and in the London parks and squares are several fine specimens, and there is also one in the centre of Cheapside. On the banks of the Bosphorus there is a specimen believed to be 2000 years old, the trunk being over 140 ft. in circumference at the base, while the branches radiate for a distance of 45 feet.

CVI. JUGLANDEÆ—Walnut Tree Order

An order of handsome deciduous trees often with a watery or resinous, but not milky, juice. Leaves alternate, often large, oddly pinnate, with entire or serrate feather-veined leaflets, often oblique or sickle-shaped. Stipules none. Flowers small monœcious; male ones often in loose drooping catkins, with or without a 3–6-lobed perianth; female ones usually in an erect spike, with a 4-toothed or lobed perianth adnate to the inferior 1-celled ovary. Stamens 3–40, often attached to a linear receptacle or torus. Fruit a dry or leathery drupe, rarely a nut, with a strong, bony, 2-valved endocarp—a scientific description of the popular Walnut.

CARYA (Hickory).—A genus of handsome deciduous Walnut-like trees with oddly pinnate leaves having serrate leaflets. The drooping male catkins are clustered in each flower, with 3–10 stamens. Female flowers in short terminal spikes, and having a 4-lobed perianth. Drupe rather dry, ovoid or roundish, splitting into 4 regular valves, and falling away from the smooth endocarp or shell.

Culture and Propagation.—The Hickories are best increased by seeds, which are often planted about 3 in. deep where the trees are intended to grow. Most of the species have long tap roots destitute of fibres, and transplanting is apt to injure them severely. If sown in small pots with a tight-fitting 'stopper' over the hole at the bottom, the tap root will be prevented from getting out, and will circle round the sides of the pot instead; the seedlings could be readily transplanted to their permanent positions afterwards, and this method is preferable to planting the seeds here and there in the open ground. Cuttings of the tips of the growing roots will sometimes root in sandy soil. Grafting and budding when the plants are in a dormant state will also succeed; but the easiest way is by seed.

C. alba (*Shell-bark Hickory*).—A fine tree 50–70 ft. high, native of the Eastern United States and Canada. Leaves composed of 5 finely serrate, more or less oblong or obovate lance-shaped leaflets. Flowers in May, greenish. Fruit globular or depressed, containing a white thin-shelled nut.

Culture &c. as above.

C. amara (*Bitter Nut; Swamp Hickory*).—A native of the same region as *C. alba*, and growing 50–60 ft. high. Leaves composed of 7–11 more or less oblong lance-shaped leaflets, downy when young. Flowers in April, greenish; catkins in pairs. Fruit roundish, with 6 narrow ridges, and containing a round short pointed nut.

Culture &c. as above.

C. microcarpa. — A beautiful North American tree with leaves usually composed of 5 more or less broadly oblanceolate roundly toothed and pointed leaflets 4–6 in. or more long, the odd terminal leaflet being larger and broader than the others about 6–8 in. long. In autumn the foliage of this species, as well as that of the others, assumes a soft yellow tint. It is now regarded as a variety of *C. porcina*.

Culture &c. as above.

C. olivæformis (*Pecan Nut*). — This grows with the two preceding species, and attains a height of about 30 ft. Leaves having 13–15 oblong lance-shaped or sickle-shaped serrate leaflets, gradually tapering to a point. Flowers in April and May, greenish. Nut olive-shaped.

Culture &c. as above.

C. porcina (*C. glabra*). — *Pig Nut; Brown Hickory*.—A fine tree 70–80 ft. high, from E. North America. Leaves with 5–7 oblong or obovate lance-shaped serrate leaflets. Flowers in May, greenish. Nut oblong or oval, with a thick bony shell.

Culture &c. as above.

C. tomentosa (*Mocker Nut; White-heart Hickory*).—A companion of the preceding species in a wild state, often 60–70 ft. high. Leaves composed of 7–9 obovate or oblong lance-shaped pointed leaflets. Flowers in May, resinous scented, in short catkins. Fruit roundish or ovoid, with a thick hard husk, enclosing a very thick-shelled round brownish nut, 4-ridged towards the summit. The variety *maxima* has fruits as large as an Apple, with an extremely thick husk.

Culture &c. as above.

JUGLANS (Walnut).—A genus containing 7 or 8 species of trees with an odorous or resinous bark, and large alternate oddly pinnate leaves. Male catkins lateral, drooping, the flowers having a 5–6-lobed perianth with irregular borders, and 8–40 stamens on a linear torus. Female flowers few, in terminal spikes. Perianth 4-lobed, surrounded by an involucre consisting of bracts and bracteoles adnate to the ovary. Drupe ovoid or globose, with a thick fleshy husk bursting irregularly, and containing a thick hard wrinkled bony-shelled nut, opening by 2 valves.

Culture and Propagation.—Walnuts, apart from their value as fruit trees, are highly ornamental and suitable for parks and large gardens. They flourish in rich deep soil where the roots can ramble away to moist spots. I know some fine old Walnut trees which flourish in what appears to be the poorest soil, that has never been touched in any way for years, and is simply as hard as a macadam road. Still the plants produce large crops of fruit almost every year, and are in the best of health. Walnut trees are increased in the same way as the Hickory described above, chiefly by sowing the seeds when ripe.

J. cinerea (*Butter Nut*).—A native of the United States, 30–60 ft. high. Leaves composed of 15–17 lance-shaped serrate leaflets, rounded at the base and downy beneath. Flowers in spring, greenish. Fruit oblong ovoid taper-pointed, downy and clammy.

Culture &c. as above. A hybrid between this species and *J. regia* has been obtained and is known as *J. alata*.

J. mandschurica.—A very handsome Walnut tree, native of Amurland. The leaves are over 30 in. long and composed of about 15 lance-shaped acute leaflets 4–8 in. long, feather-veined and somewhat toothed on the margin. The fruits are about the size and shape of a hen's egg, but rather more pointed at the attached end. The kernel, although edible, is not so palatable as that of the Common Walnut, but they ripen 2 or 3 weeks earlier.

Culture &c. as above.

J. nigra.—A tree about 60 ft. high, native of the United States. Leaves having 13–17 heart-shaped tapering serrate leaflets, unequal at the base, and somewhat downy. Flowers in spring, greenish. Fruit round, roughish, with minute projections on the husk.

Culture &c. as above. This species has also been crossed with *J. regia* and has produced a hybrid called *J. pyriformis.*

J. regia (*Common Walnut Tree*).—A beautiful and well-known nut and shade tree 40–60 ft. high, native of Persia. Leaves consisting of 5–9 oblong oval smooth, obscurely serrate bright green leaflets 6–8 in. long. Flowers in spring, greenish. Fruit egg-shaped, with a green husk, and containing a wrinkled bony nut, which forms an important article of commerce. There are several varieties of the Common Walnut, among which may be mentioned *elongata* (or *barteriana*), which has much longer nuts than the ordinary type; *longirostris* is an extraordinary variety, easily recognised by the fruits being prolonged into a long beak. Other forms are *laciniata*, *monophylla*, and *pendula.*

Culture &c. as above.

J. sieboldiana.—An ornamental Japanese tree, having thin, soft, shortly toothed sessile leaflets, green above, pale beneath. Flowers in spring, greenish, the males in long slender catkins. Fruit violet-red when young, woolly, and borne in drooping clusters.

Culture &c. as above.

PTEROCARYA.—A genus with 3 or 4 species of ornamental trees with large leaves pinnately divided into numerous narrow leaflets. Flowers monœcious in long drooping spikes. Perianth of the male flowers irregularly 3–6-lobed. Stamens 9–18 on a linear torus. Perianth of the female flowers adnate to the ovary, with a free shortly 4-cleft limb. Drupe dry, angled, having 2 wings. Seeds 4-lobed at the base.

Culture and Propagation.—Pterocaryas flourish under similar conditions to the Hickory and Walnut, and may be increased in the same way from seeds, and also by suckers and layers.

P. caucasica (*P. fraxinifolia*).—A fine ornamental tree 20–40 ft. high, native of the moist woods of the Caucasus. Leaves 12–18 in. long, resembling those of the Walnut, and composed of about 15 oblong lance-shaped, smooth, and sharply serrate leaflets, each 3–4 in. long, and remarkable for their clear yellow colouring in autumn. Flowers in May, greenish, borne in drooping spikes or catkins, the female ones being 10–12 in. long, and the males about half that length.

Culture &c. as above. This is the best known species in cultivation.

P. rhoifolia (*P. japonica; P. sorbifolia*).—An ornamental tree, native of Japan, where it grows at an elevation of 2500 to 4000 ft. above sea-level, and often reaches a height of 80 ft. The leaves are 9–12 in. long, with a woolly rachis or main midrib, to which the downy leaflets, each 2–4 in. long, are attached. Flowers have not yet been produced in British gardens, I believe, but in a wild state the females are borne in catkins about 10 in. long, while the male ones are on catkins only 2–3 in. long.

Culture &c. as above. As this tree has not been introduced to cultivation many years, there are yet no fully grown specimens of it, but it promises to become as ornamental as *P. caucasica.*

P. stenoptera (*P. chinensis*).—A noble and ornamental tree, native of N. China, with leaves 10–15 in. long, and composed of 15–21 leaflets, between which the intervening portions of the main midrib (or rachis) are winged—a character which at once distinguishes this species from the others. The male and female catkins are about the same length as those of *P. rhoifolia*, and the roundish fruits are furnished with 2 side wings, each more than an inch long.

Culture &c. as above.

CVII. MYRICACEÆ—Sweet Gale Order

An order of trees or shrubs, often aromatic, with alternate feather-veined, entire, serrate, irregularly toothed or lobed, or regularly pinnatifid leaves and no stipules, except spurious ones in *Myrica asplenifolia.* Flowers 1-sexed; males in short cylindrical spikes; females in ovate sessile catkins. Perianth none. Stamens 2–16, often 4–6, in the axil of each bract. Ovary sessile, 1-celled. Fruit a small round or ovoid drupe, often covered with waxy papillæ or small raised dots.

MYRICA (Candleberry Myrtle).—This is the only genus of the order, and its essential characters are given above.

M. asplenifolia (*Comptonia asplenifolia*).—*Sweet Fern.*—A distinct North American shrub 3–4 ft. high, remarkable for its deciduous, fragrant, Fern-like leaves, which are lance-shaped and pinnately cut and toothed, and sprinkled with yellowish resinous dots. Stipules half heart-shaped. Flowers in March and April, whitish. Male catkins lateral, cylindrical; female ones ovate.

Culture and Propagation. — This species grows freely in moist peaty soil, and prefers a somewhat shaded situation. It may be increased by layers and offsets or suckers in autumn; and by seeds sown in cold frames as soon as ripe. It may be grown in peaty borders with Heaths, Azaleas, Rhododendrons, Kalmias, and other Ericaceous plants.

M. californica.—A Californian species said to attain a height of 30–40 ft. in its native state. Leaves oblanceolate acute, thick, slightly woolly beneath, 2–4 in. long, and somewhat toothed. Flowers greenish, monœcious, succeeded by purple fruits thinly coated with greyish-white waxy papillæ.

Culture &c. as above. May be grown like *M. asplenifolia.*

M. cerifera (*Common Candleberry Myrtle*).—A Canadian evergreen shrub, 5–12 ft. high, with flat shining green lance-shaped pointed serrate leaves. Flowers in May, reddish, succeeded by waxy fruits.

Culture &c. as above.

M. Gale (*Sweet Gale; Bog Myrtle*).—A beautiful fragrant bush 2–4 ft. high, native of the bogs and moors in the British Islands. Leaves 2–3 in. long, narrowly wedge-shaped obovate or lance-shaped serrate, shortly stalked, and often downy beneath. Flowers from May to July, brownish-green, the female ones having red styles, the male ones 4 stamens.

Culture &c. as above.

CVIII. CUPULIFERÆ—Oak, Beech, and Birch Order

An important order of trees or shrubs with alternate feather-veined, serrate, dentate, or entire, rarely lobed, never compound leaves, which are deciduous in most of the hardy species. Stipules free, often fugacious. Flowers monœcious; the male ones solitary, crowded, or in spikes, with or without an irregular perianth of 5 or more segments. Stamens 2–4, or numerous. Female flowers with or without an adnate perianth. Ovary inferior or naked, more or less perfectly 2–3- (rarely 4–6-) celled after fertilisation. Fruit an indehiscent glans or nut, seated on, or enclosed by, the cup-like involucre formed of the hardened accrescent bracts.

As may be seen below, most of our hardy native trees, like the Birch, Alder, Hazel, Oak, Beech, belong to this natural order, as well as many fine exotic ones.

BETULA (Birch).—A genus of ornamental trees and shrubs, with alternate, toothed or serrate, rarely incised, feather-veined leaves. Flowers monœcious, in axillary or terminal spikes appearing at the same time as the leaves. Male catkins cylindrical, loose, imbricated with ternate concave scales, the middle one largest, ovate; perianth sessile, membranous, with 4 segments, or fewer by abortion, stamens 2. Female catkins similar, but more dense and compact; perianth none. Ovary 2-celled; styles 2. Nut small, flattened, narrowly or broadly 2-winged.

Culture and Propagation. — The Birches are graceful and ornamental trees that never fail to secure the admiration of the woodland artist. They flourish in a light sandy loamy soil, but practically grow well in all ordinary garden soils. Many kinds flourish exceedingly well near the banks of lakes, streams, rivers, &c., and in such positions add a good deal to the beauty of the landscape. They are as a rule best increased by sowing well-ripened and thoroughly dried seeds in March. The seeds are not covered with soil, but pressed into it with the feet. During the summer the seed beds should be shaded with branches if necessary, and the seedlings may be transplanted the following spring.

Layering is also used in connection with low bushy forms in the autumn, while rare and choice varieties are increased by grafting or budding on stocks of the commoner kinds, the grafting being done about March, and the budding in June or July. The amateur, however, unless he is desirous of experimenting for himself, will save a good deal of time by obtaining well-established trees or bushes from a nurseryman, instead of trying to raise them in his own garden. The following is a list of the most ornamental Birches in cultivation.

B. alba (*Silver*, *White*, or *Common Birch*).—A beautiful native tree varying in height from a small shrub in the extreme north to a graceful tree 50–80 ft. in more southern localities, with a trunk 8–24 in. in diameter, and having a silvery-white flaky bark. Leaves long-stalked ovate acute doubly serrate, 1–3 in. long, with broad stipules. Flowers in April and May; male catkins drooping ½–2 in. long; female catkins shorter, and somewhat erect. Fruit roundish, with a notched wing.

There are many forms of the Silver Birch, the most striking being *albo-purpurea*, the leaves of which are of a lustrous rich purple hue above, whitish beneath; *dalecarlica*, leaves deeply and pinnately divided into toothed lobes; *foliis variegatis*, leaves blotched with yellowish-white; *laciniata pendula*, as the name indicates, has a drooping habit, and deeply laciniated dark green leaves. There are a few forms of this, that known as Young's Weeping Birch being most generally grown in nurseries; *pendula*, the Weeping Birch, a well-marked variety distinguished from the type by its more slender, smoother, and drooping branches; *pendula Youngi* is a still finer weeping Birch; *fastigiata* has erect branches, and resembles the Lombardy Poplar in habit; *aurea* has yellowish leaves; *purpurea*, purple ones; *variegata*, leaves blotched with white; and *urticæfolia*, with deeply laciniated sharply toothed, hairy leaves.

The Birch is a rapid growing tree, but unfortunately does not attain a great age, and seldom increases much in size after 30 years. As a lawn tree or for parks and large gardens it is very ornamental, quite as much in a leafless as in a leafy state, owing to its smooth white bark and graceful twiggy branches. This species grows nearer the North Pole than any other tree, and is the only one existing in Greenland, where it is, however, much stunted in growth. The bark and wood have a commercial value in many countries.

Culture &c. as above.

B. Bhojpattra.—A Himalayan Birch about 50 ft. high, with pale brown bark and oblong acute serrate leaves heart-shaped at the base, and having hairy stalks and nerves. Flowers in May; female catkins erect cylindrical oblong. Fruit narrow-winged. This tree is best in southern parts of the country in warm sheltered places, and is also known as *B. utilis*.

Culture &c. as above.

B. davurica.—A beautiful Siberian tree 30–40 ft. high, with smooth ovate unequally toothed leaves, narrowed at the base. Flowers in February and March in whitish-brown catkins. The variety *parvifolia* is distinguished from the type by its smaller leaves.

Culture &c. as above.

B. Ermani.—A pretty Japanese Birch resembling *B. alba* in having white-barked trunks. The leaves are heart-shaped and tapering to a point, with irregularly toothed margins. The male catkins are 2–3 in. long, and fully ripe with pollen by the end of March or April.

Culture &c. as above.

B. fruticosa.—A shrubby Birch from Eastern Siberia, growing only 5–6 ft. high in moist situations, but taller on the hillsides. Leaves smooth, roundish ovate, nearly equally serrate. Flowers in February and March, whitish-brown.

Culture &c. as above.

B. glandulosa.—A handsome Canadian shrub, only 2–8 ft. high, having smooth gland-dotted branches, and almost stalkless obovate serrate leaves, quite entire at the base. Flowers in May, whitish; female catkins oblong. Useful for hills, mounds, knolls &c.

Culture &c. as above.

B. humilis. — A pretty little Birch about 4 or 5 ft. high, native of the N. temperate parts of the Old and New World. Leaves obovate, rounded and coarsely toothed at the apex, but narrowed and entire at the base, and much larger on the non-flowering branches.

Culture &c. as above.

B. lenta (*B. carpinifolia*).—*Sweet Cherry Birch.*—A handsome N. American tree 70–80 ft. high with heart-shaped ovate sharply serrate and taper-pointed leaves, with hairy stalks and nerves. Flowers in May and June, greenish-white. This tree yields a valuable timber, and its leaves are said to make an agreeable tea.

Culture &c. as above.

B. lutea (*B. excelsa*).—*Yellow Birch.* A native of Nova Scotia 70–80 ft. high, with broadly ovate acute and serrate leaves about 3½ in. long, on downy stalks. Flowers in May, greenish-white. The timber is used in shipbuilding.

Culture &c. as above.

B. Maximowiczi.—A handsome quick-growing Birch, native of Japan, where it forms a shapely tree 80–90 ft. high with a trunk 2–3 ft. in diameter, covered with a pale smooth orange-coloured bark. The deep green shining leaves are very large, being 7–8 in. long and 5–6 in. wide, with irregularly and coarsely toothed margins.

Culture &c. as above.

B. nana.—A native of Scotland and N. Europe, 1–3 ft. high, with roundish crenate leaves, distinctly net-veined beneath. Flowers in April and May, whitish-green; female catkins erect stalked cylindrical. The variety *pendula* has drooping branches. May be used in the same way as *B. glandulosa.*

Culture &c. as above.

B. nigra (*B. rubra*).—*Red Birch.*—A native of the United States 60–70 ft. high with rhomboid ovate doubly serrate acute leaves, entire at the base, downy on the under surface. Flowers in May, greenish-white, the female catkins being straight and nearly cylindrical, about 2 in. long. This species is often called the Black Birch, but that name is more correctly applied to *B. occidentalis.*

Culture &c. as above. This tree flourishes in moist situations, and is suitable for planting by the banks of lakes, rivers, streams, &c. It is easily recognised by the bark, which peels off in flakes and gives the trunk a ragged appearance.

B. occidentalis (*Black Birch*).—A graceful N. American Birch 20-40 ft. high, with slender drooping branches covered with dark shining bark. The rather dull green leaves are broadly ovate and pointed at the apex, the margins being furnished with sharp teeth.

Culture &c. as above.

B. papyracea.—A fine N. American tree 60–70 ft. high, with very flexible branches, and ovate taper-pointed doubly serrate leaves, having smooth stalks and hairy nerves beneath. Flowers in May and June, greenish-white; the female catkins drooping on long stalks. There are several varieties of this species, but all are remarkable for the beautiful whiteness of the stems, which retain their colour longer than those of *B. alba*, and are somewhat smoother.

Owing to the wood having been used for making canoes in N. America, and the bark for paper, the tree is known as the 'Canoe' and 'Paper Birch.'

Culture &c. as above.

B. populifolia (*Canadian White Birch*). A Canadian tree about 30 ft. high, closely resembling the Common British Birch in habit, but less vigorous in growth. Leaves deltoid, very much tapering, quite smooth and unequally serrate. Flowers in April and May, greenish-white. The variety *laciniata* has large shining green, deeply cut leaves.

Culture &c. as above.

B. pumila. — A beautiful Canadian shrub, 2–3 ft. high, with downy undotted branches, and long-stalked roundish-ovate leaves, densely hairy beneath. Flowers in May and June, whitish; the female catkins cylindrical. Useful for planting on hills, mounds, knolls &c., like *glandulosa* and *nana.*

Culture &c. as above.

B. ulmifolia.—An ornamental Japanese Birch 50–60 ft. high, with a smooth white bark, and broadly ovate leaves, tapering to a point, and coarsely and irregularly toothed on the margins.

Culture &c. as above.

ALNUS (Alder).—A genus of deciduous trees and shrubs with alternate feather-veined, serrate or rarely quite entire leaves. Flowers monœcious; the male flowers in drooping scaly-bracted catkins, lasting throughout the winter. Perianth sessile 4-parted. Stamens 4. Female flowers in cylindrical oblong or oval catkins, like small Fir-cones in shape, having fleshy scales which become hard and woody when ripening. Perianth none. Nuts small flattish, 2-winged or naked.

Culture and Propagation.—Alders are propagated in much the same way as Birches. The ripe seeds are collected in October or November and carefully dried to prevent them becoming mouldy or rotten. They are sown in spring and very slightly covered with soil. In November or March the seedlings, which will be 10–12 in. high, should be transplanted 6 in. apart in rows about 18 in. apart, and by transplanting a couple of years or so in succession masses of fine fibrous roots are developed. The rarer varieties may be increased by budding and grafting like the Birches. It is better, however, to buy established plants from nurserymen.

The generic name *Alnus* means 'near the bank of a river,' and thus indicates the locality in which the Alder is found growing naturally. The Alders like the Birches are graceful in habit and generally flourish in moist situations near ponds, lakes, rivers &c. When a plantation is being made, the roots should be carefully spread out over the bottom of the hole, which should not be more than 9 or 10 in. deep. The soil should be worked in well among the roots, and afterwards trodden down firmly. The best time for planting is during November or March.

A. cordifolia (*Italian Alder*).—A handsome round-headed Alder 15–50 ft. high, native of Southern Italy, and recognised by its light-coloured bark and dark shining green heart-shaped serrate taper-pointed leaves. Flowers in March and April, greenish-brown, appearing before the leaves.

This is a fast-growing species and proves to be quite hardy in England notwithstanding its origin. It flourishes in a dry soil.

Culture &c. as above.

A. firma (*Japanese Alder*).—A very distinct Japanese tree, having oval lance-shaped taper-pointed, sharply serrated, and many-nerved leaves.

Culture &c. as above.

A. glutinosa.—A quick-growing British tree, sometimes attaining a height of 50–70 ft., and distinguished by the black bark and roundish wedge-shaped bluntly lobed serrate leaves, downy in the nerve-axils beneath, and when young, clammy like the branches. Flowers in spring; male catkins long, large, and cylindrical, drooping on branched stalks; female catkins, small, ovate, with deep red scales.

There are several varieties of the Common Alder more ornamental perhaps for gardens and parks. Among them may be mentioned the Golden Alder (*aurea*) with golden-yellow foliage; the Cut-leaved Alder (*laciniata*) having the oblong leaves pinnately divided into acute lobes; the Oak-leaved Alder (*quercifolia*), a very distinct form having sinuate leaves like those of the Common Oak; there is also a variegated form of the Oak-leaved Alder, and one called *imperialis* or *asplenifolia*, almost similar to the ordinary *quercifolia*; and the Hawthorn-leaved Alder (*incisa* or *oxyacanthifolia*), a compact form with leaves cut like those of the Hawthorn.

A useful tree near the margins of rivers, lakes &c., or as a break-wind to more tender plants. Its wood, which lasts a long time under water without decaying, is used for many things.

Culture &c. as above.

A. incana (*Gray*, *White*, or *Hoary Alder*).—A native of the N. hemisphere, but not of Britain, with broadly oval or ovate sharply serrate leaves, rounded at the base, white and mostly downy beneath. This prefers somewhat drier situations than the Common Alder. In warm southern parts it attains a greater height than the Common Alder, but in cold climates and unfavourable spots it rarely reaches a height of more than 8–20 ft. The fine-grained white wood soon rots under water. There are a few forms such as *glauca*, *hirsuta*, *incisa*, *pendula* &c.

Culture &c. as above.

A. viridis (*Green Alder*).—A native of the N. Hemisphere but not of Britain, with roundish or slightly heart-shaped sharply serrate-toothed leaves, clammy and smooth or softly downy beneath. Flowers in spring; female catkins ovoid, clustered on slender stalks.

Culture &c. as above.

CARPINUS (HORNBEAM).—A genus containing 9 species of deciduous trees, rarely shrubs, with alternate stalked leaves, often doubly serrate, with close and parallel rather plaited veins. Flowers monœcious; male catkins sessile cylindrical; perianth none; stamens 8 or more in the axils of the ovate acute bracts. Female flowers in terminal drooping bracteate catkins, 2 at the base of each deciduous bract. Nut sessile at the base of the bracteoles or half enclosed, ovoid or roundish, strongly nerved.

Culture and Propagation.—Hornbeams are raised from seed in the same way as the Alders, but the seeds sprout very irregularly, some taking quite a year before appearing above ground. When about 2 years old, having been transplanted from the seed-beds the year previous, the young Hornbeams may be used for hedges, for which they are particularly well adapted as they stand clipping well. From an ornamental point of view there is not much to be said about the Hornbeam, but as it is found in many parts of the country it deserves mention here.

C. americana (*American Hornbeam*). A North American tree 10–50 ft. high, with ovate oblong pointed sharply and doubly serrate leaves becoming smooth with age. This tree is also known as *C. caroliniana*.

Culture &c. as above.

C. Betulus (*Common Hornbeam*).—A British tree 30–70 ft. high with elliptic ovate acute, doubly serrate leaves 2–3 in. long, hairy beneath. Flowers in May, yellowish, producing ripe brown nuts late in autumn.

There are several forms of the Common Hornbeam, the best known being *aureo-variegata*, leaves variegated with gold; *incisa*, leaves incised; *quercifolia*, Oak-leaved; and *variegata*, variegated with white.

Culture &c. as above.

OSTRYA (HOP HORNBEAM). — A genus containing only two species of deciduous trees, very much resembling *Carpinus* in foliage. Flowers monœcious; female ones in terminal drooping catkins, each enclosed in an inflated membranous involucre which enlarges and closes over the fruit.

Culture and Propagation.—The Hop Hornbeams thrive in ordinary soil, but rarely ripen seeds in the British Islands. They can therefore only be increased from imported seeds, but they may also be grafted on stocks of the Common Hornbeam (*Carpinus*).

O. carpinifolia (*O. vulgaris*).—*Common Hop Hornbeam.* — A much-branched round-headed tree, 30–60 ft. high, native of S. Europe, and having heart-shaped ovate acute leaves resembling those of the Common Hornbeam. Flowers in May, greenish-white, the drooping female catkins somewhat resembling the 'heads' of Hops.

Culture &c. as above.

O. virginica (*Iron-wood; Lever-wood*).—A native of the Eastern United States, 15–40 ft. high, with ovate oblong taper-pointed leaves, and Hop-like heads of greenish-white flowers in May.

Culture &c. as above.

CORYLUS (HAZEL; COB-NUT).—A genus containing about 7 species of deciduous trees or shrubs with alternate feather-veined, doubly serrate leaves, plaited in bud. Flowers monœcious; male ones without a perianth, in drooping clustered catkins. Stamens 4–8. Female flowers minute, sessile in pairs in the upper bracts of a small head. Fruit by abortion 1-celled, 1-seeded, woody, more or less enclosed in the leafy involucre, consisting of the much enlarged more or less cut bract and bracteoles.

Culture and Propagation. — The Hazels are not only valuable as nut-bearing trees, but also as ornamental trees and shrubs with graceful habit and beautiful foliage. The best known species are briefly described below, but the cultivation and propagation are dealt with in detail in the fruit section of this work (see p. 1099). It may, however, be stated here that all the Hazels flourish in deep rich loamy soil, well-tilled and manured, and they enjoy a rather dry and open sunny situation, although they also thrive in partially shaded spots. They may be increased by means of seeds sown when ripe, and also by layering the branches in autumn. As ornaments for the park or garden they are of great value, and some of them look well in beds and groups on grass by themselves. In the autumn they are remarkable for the beautiful mellow colouring of the foliage.

C. americana (*American Hazel*).—A shrub 4–8 ft. high, native of the shady woods from Canada southwards to Florida. Leaves roundish, heart-shaped, tapering. Flowers in April, males greyish, females crimson. Nuts brown, ripe in October, enclosed in a roundish bell-shaped toothed and serrate involucre.
Culture &c. as above.

C. Avellana (*Common Hazel* or *Filbert*).—A well-known British tree 20 ft. or more high, with roundish heart-shaped doubly serrate abruptly pointed leaves 2–4 in. long, unequal at the base, and shortly stalked. Flowers in April, males greyish, females crimson. Nut brown, ripe in October; involucre bell-shaped rather spreading, torn at the edges. The variety *purpurea*, known as the 'Purple Hazel,' is a beautiful shrub with large rich lustrous purple leaves resembling those of the Purple Beech. By cutting it back every year when dormant, strong shoots and large leaves are produced. Other varieties are *aurea*, with yellowish leaves; *contorta*, with curiously distorted branches; *heterophylla* (also known as *urticæfolia* and *laciniata*), a handsome form, the leaves of which are cut into pointed lobes with sharply and irregularly toothed margins; and *pendula*, a weeping variety which looks graceful drooping from the top of a standard stem.
Culture &c. as above.

C. Colurna (*Constantinople Hazel*).—A large ornamental tree from Turkey and Asia Minor where it grows 60 ft. high. It has whitish flaky bark and roundish heart-shaped leaves, with lance-shaped taper-pointed stipules, and masses of floral catkins as in the Common Hazel, but larger and longer, and giving quite a distinct appearance to the tree.

Culture &c. as above. This species is best increased by means of layers made in autumn. There is a very fine specimen in the Botanic Gardens at Oxford.

C. heterophylla.—A distinct shrub or small tree from E. Asia with broadly obovate irregularly toothed 5–7-lobed leaves, unequal or heart-shaped at the base. This species is not yet very well known, and should not be confused with the variety of the Common Hazel bearing the same name.
Culture &c. as above.

C. maxima.—A native of S. Europe, closely resembling the Common Hazel in appearance and foliage, but of somewhat taller growth. There are many varieties or forms of it, one of which (*barcelonensis*) yields the well-known Barcelona Nut of commerce. For decorative garden purposes, however, the most attractive variety is that known as *atropurpurea*, which is remarkable for its beautiful bright purple leaves.
Culture &c. as above.

C. rostrata. — A bushy shrub 4–5 ft. high, found from Canada to Carolina, and closely resembling the British Hazel. Leaves ovate oblong taper-pointed, with linear lance-shaped stipules. Flowers and nuts like those of the British Hazel. Involucre bell-shaped or tubular, with two incised-toothed divisions.
Culture &c. as above.

QUERCUS (Oak).—A genus of deciduous and evergreen trees, rarely shrubs, with alternate entire toothed or lobed membranous or leathery feather-veined leaves. Flowers monœcious. Male ones in loose slender catkins, with a bell-shaped 4–7-, often 6-, lobed perianth. Stamens numerous, often fewer than 6, sometimes 10–12, with slender protruding filaments. Female flower solitary, with a 3–8-lobed perianth, and enclosed in imbricating bracts and scales. Fruit a nut or glans seated in a cup formed by the hardened bracts and scales.

There are about 300 species of Oak altogether, distributed chiefly over the north temperate regions, while a few are found on the mountains of some tropical countries. The Oak is essentially a forest tree, and from a gardening and picturesque point of view is suitable only for parks and very large gardens. Many of the kinds which shed their leaves at the approach of winter are remarkable for the brilliant colour tints of their foliage during the autumn months, and such kinds should always find a place in the park or garden. But for winter effect among the Oaks the evergreen and semi-evergreen kinds are useful, not only in appearance, but as sheltering breaks for more tender plants. Our British Oak, famous in many ways, is too well known to need a mere botanical description here. The kinds mentioned below are from other countries, and are useful for growing in the British Islands.

Culture and Propagation.—Oaks enjoy a rich loamy soil to attain luxuriant proportions, and as long as there is a fair amount of moisture available, their far-reaching roots will find it.

The propagation of the Oak is usually effected by means of seeds—the 'acorns.' As these do not retain their vitality for a very long period, it is best to sow them as soon as ripe. Where any rare or choice variety exists it must be increased by grafting on to stocks of the Common Oak (*Quercus Robur*). As the seedlings produce a long and strong tap root, which is easily broken, great care should be exercised in transplanting, so as not to do too much injury. The following is a short list of the best evergreen and a few deciduous Oaks grown.

Q. acuta (*Q. Buergeri*).—A beautiful Japanese evergreen tree or shrub with elliptic or oblong entire or undulate-crenate leaves 2–4 in. long, smooth when old, but covered with rusty down in a young state. There is a variety called *albo-nervis* with white veins, and another called *rubro-nervis* with red veins. Fruit-cup hemispherical with concentric rings; nut ovoid or elliptic, three times longer than the cup.

Culture &c. as above.

Q. Ægilops (*Q. Ungeri*). — *Vallonea Oak.*—A more or less evergreen tree 20–50 ft. high, native of the Grecian Archipelago. Leaves ovate oblong with bristle-pointed tooth-like lobes, hoary beneath. Fruit-cup very large hemispherical, with long lance-shaped spreading scales; nut brown, handsome. The variety *latifolia* has broader leaves than the type, and *pendula* is recognised by its more or less drooping habit.

Culture &c. as above.

Q. agrifolia (*Enceno Oak*). — A Californian evergreen about 20 ft. high, having downy young branches, and broadly ovate or oval leaves about 2 in. long, with remote spiny teeth. Fruit-cup turbinate with more or less ciliated adpressed scales; nut ¾–1¼ in. long, more or less ovoid oblong in shape.

Culture &c. as above.

Q. Cerris (*Bitter*, *Moss-cupped*, or *Turkey Oak*).—A handsome deciduous Oak 40–60 ft. high, native of S. Europe, having downy young branches and oblong or obovate sinuate-toothed or often pinnately cut leaves, somewhat hairy on both sides, and turning soft brown in autumn. Fruit-cup hemispherical, bristly with long downy scales; nut brown, cylindrical, ¾–1¼ in. long. This grows more rapidly and makes a more symmetrical tree than our native Oak. There are several varieties, one with variegated leaves, and another known as *fulhamensis* has almost evergreen leaves more deeply incised than those of the type.

Culture &c. as above.

Q. chrysolepis (*Live Oak*).—A handsome Californian evergreen tree attaining a good size in its native country, the trunk often having a diameter of 3–5 ft. Leaves dark green spiny-toothed, covered with a golden down or fur beneath.

Culture &c. as above.

Q. coccifera (*Kermes Oak*).—An evergreen species native of S. Europe and the Levant, where it forms a good-sized tree, but in this country a dense bush with downy branchlets and elliptic oblong spiny-toothed rigid leaves. Fruit-cup hemispherical with velvety scales; the nut being more or less protruding.

The Kermes insect which feeds on this species in its native habitat yields a scarlet dye almost equal to cochineal.

Culture &c. as above.

Q. coccinea (*Scarlet Oak*).—A handsome deciduous N. American Oak about 50 ft. high in a wild state, having bright shining green pinnately cut leaves 3–8 in. long, and remarkable for assuming more or less deep tints of red or scarlet in autumn, which renders it a very effective plant on the landscape. Fruit-cup top-shaped or hemispherical with a conical scaly base; nut ½–¾ in. long, half covered by the cup.

Culture &c. as above.

Q. conferta (*Q. pannonica*).—*Black* or *Hungarian Oak; Gipsy Tree.*—A native of S.E. Europe, forming a handsome round-headed tree 20–30 ft. high, and having beautiful deciduous leaves 5–7 or more inches long, oblong obovate in outline, and pinnately cut into bluntly toothed lobes. It rarely or ever fruits in this country, but may be increased by grafting on stocks of the Common Oak.

Culture &c. as above.

Q. cuspidata. — An evergreen Oak about 30 ft. high, native of Japan. Leaves ovate lance-shaped or oblong, leathery, entire or wavy-toothed, 1½–3½ in. long, downy when young, smooth when old. There is a pretty variegated variety, and also one with narrow (*angustifolia*), and one with broader (*latifolia*) leaves than the type.

Culture &c. as above.

Q. densiflora.—A more or less evergreen Oak from the Californian mountains, where it attains a height of 50–60 ft. or more. It has beautiful leathery deep green leaves more or less oblong ovate or obovate in outline, with almost entire wavy cartilaginous margins. Fruit-cup nearly ¾ in. broad, with an ovoid downy half-protruding nut.

Culture &c. as above.

Q. glabra.—A handsome Japanese Oak forming large bushes in cultivation, and having oblong obovate entire smooth leaves 2–4 in. long, and upright spikes of oblong acorns which take two years to ripen properly. There are several variations of this species according to trade catalogues.

Culture &c. as above.

Q. Ilex (*Q. Gramuntia*). — *Holly* or *Holm Oak.*—A valuable and handsome evergreen Oak 20–30 ft. high, native of S. Europe, with elliptic oblong ovate or lance-shaped toothed or entire leathery leaves 2–3 in. long, deep shining green above, hoary beneath. There are several forms of the Holly Oak, among which may be mentioned *crispa*, with leaves wrinkled at the edges; *fagifolia* with broader more or less wavy, and sometimes slightly serrate leaves; *Fordi* (or *fastigiata*) with a pyramidal habit; *integrifolia*, leaves lance-shaped entire; *latifolia*, leaves broad and nearly entire; *longifolia*, leaves long and narrow; and *serratifolia*, leaves lance-shaped serrate.

Culture and Propagation. — These varieties show that the Holly Oak is a very variable plant, and if allowed to grow naturally assumes fine proportions. It is usually very hardy in most parts of the country, but it sometimes loses its leaves in severe frosts in the bleaker localities.

Q. rubra (*Champion* or *Red Oak*).—A large N. American tree with rather smooth dark grey bark and elliptic oblong pinnately lobed thinnish leaves, which assume a beautiful deep red tint late in autumn or when touched by frost. Fruit-cup saucer-shaped or flat with a narrow raised border; nut oblong ovoid, 1 in. or so long.

Culture &c. as above.

Q. Suber (*Cork Oak*).—A handsome S. European evergreen 25–30 ft. high, interesting on account of its bark supplying the Cork of commerce. Leaves oblong oval coarsely toothed, smooth above, hoary beneath. Fruit-cup obovate hemispherical, with a nut often half as long again.

Culture &c. as above.

Q. virens.—This is the evergreen Live Oak of Virginia where it grows about 40 ft. or more high. Leaves 1–3 in. long, oblong elliptic, hoary beneath, entire or irregularly lobed or toothed. Fruit-cup top-shaped with a protruding oblong nut. From its appearance this tree resembles the Holly or Holm Oak, and forms of the latter are often sold for it in error. The true *Q. virens* seems to be rather rare.

Culture &c. as above.

CASTANEA (SWEET or SPANISH CHESTNUT).—A small genus of deciduous trees with alternate often serrate-toothed and parallel feather-veined leaves. Flowers monœcious, in erect 1-sexed or androgynous (2-sexed) spikes. Male flowers clustered on long naked cylindrical catkins with a 5–6-parted perianth and 10–20 stamens. Female flowers 2–3 together in a prickly 4-lobed involucre which at maturity encloses the leathery-coated glossy brown fruits or nuts.

C. sativa (*C. vesca*).—A highly ornamental tree 50–70 ft. high, native of Asia Minor, with oblong lance-shaped pointed sharply serrate deep green leaves. When bearing its numerous yellowish catkins of flowers it looks particularly handsome, but apart from this the aspect of the tree is such as to mark it as noble. The fruits are ripe in October. There are a few varieties, the most showy being *aureo-marginata* having the leaves beautifully variegated with yellow. This seems to be a rather delicate plant, and should be grown in warm sheltered situations; *heterophylla dissecta* is another variety in which the leaves are divided into slender thread-like segments. There is also a variety *chrysophylla* with yellowish leaves, and now called *Castanopsis chrysophylla.*

Culture and Propagation. — The Spanish Chestnut flourishes in rich sandy loam, and is fairly hardy in most parts of the kingdom, although it suffers severe injury and is sometimes even killed by hard frosts in Scotland.

Propagation is effected in the same way as the Oak—by seeds, budding, and grafting. The seeds retain their vitality longer than those of the Oak, and need not be sown until March or February, in drills about 1 ft. apart. The seeds or nuts may be 3 or 4 in. apart in the drills, and covered with 2–3 in. of good soil. The following November the strongest of the young seedlings may be transplanted in rows 3 ft. apart, with about 2 ft. between each plant, and 3 or 4 years hence will have made fine sturdy plants. As with so many other trees the amateur need not worry himself with the tedious process of raising his own plants. They can be obtained much more easily from a nurseryman in all stages of growth.

FAGUS (BEECH).—A genus containing about 15 species of deciduous or evergreen trees, rarely shrubs, with alternate feather-veined often toothed leathery leaves and monœcious flowers. Male flowers in long-stalked drooping heads, with a 4–7-lobed perianth, and 8–40 much-protruding stamens. Female flowers 2–4 together in a 4-parted involucre, consisting of imbricated bracts, which eventually harden and enclose the triangular or winged usually 1-seeded nuts.

Culture and Propagation.—The Beech will flourish under the same conditions as the Spanish Chestnut, and it may be multiplied in the same way by seeds, budding, and grafting. The last two operations are usually reserved for rare and choice varieties which cannot be obtained quickly from seed. The trees flourish in a rich sandy loam, and as the roots travel just beneath the surface of the soil the latter is benefited by allowing the fallen leaves to remain in autumn and winter as a kind of natural top-dressing or mulching.

It is unnecessary to say anything here about the beauty of the Beech as a grove and woodland tree. The clean slaty-blue bark, smooth purplish twigs, and shining leathery leaves are well known to everyone. Although other species are mentioned below, none of them equal in beauty and grace our Common Beech and its many fine varieties. Burnham Beeches, first called attention to by the poet Gray, contains many fine examples of immense size. The thickness of the stunted trunks of many has been caused by 'pollarding' or cutting off the tops.

F. antarctica.—A deciduous shrub or small tree, native of Tierra del Fuego, recognised by its rugged twisted branches and bluntly ovate doubly toothed leaves 1½ in. long, narrowed at the base.

Culture &c. as above.

F. betuloides (*Evergreen Beech*).—An evergreen tree from the same region as the preceding, with bluntly ovate elliptic crenulate leathery shining green leaves. Looks handsome in winter.

Culture &c. as above.

F. Cunninghami.—A pretty evergreen Beech, native of Tasmania. It resembles *F. betuloides*, but has much smaller and more heart-shaped leaves.

Culture &c. as above.

F. ferruginea.—A N. American Beech with ovate taper-pointed thickly toothed leaves, rusty downy beneath, and having ciliated edges. It is closely related to the Common Beech, and may be a transatlantic form. There are two forms of it known, viz.: *latifolia* and *macrophylla.*

Culture &c. as above.

F. sylvatica (*Common Beech*).—A beautiful ornamental British tree 60–100 ft. or more high, having oblong ovate obscurely toothed deciduous leaves with ciliated margins. There are many fine varieties, but none of them ever attain the gigantic and graceful proportions of the type. The best known are: *cuprea*—the well-known Copper Beech—and its near relation *purpurea*, the Purple Beech, which is the more handsome of the two with its pleasing deep purple foliage; *argenteo-variegata* has the leaves striped and blotched with white, and *aureo-*

variegata with yellow. Among the varieties which have the leaves more or less deeply incised or lobed may be mentioned, *asplenifolia*, *incisa*, and *quercifolia*; *macrophylla* has leaves larger than in the typical plant; and the 'weeping' or drooping forms are known as *pendula*.

Culture &c. as above.

CIX. SALICINEÆ—Willow and Poplar Order

An order of trees or shrubs with alternate, entire, serrulate, toothed or rarely lobed, deciduous, feather-veined leaves; stipules variable. Flowers diœcious (*i.e.* male and female borne on separate plants), usually appearing before the leaves, and having no distinct perianth. Both male and female flowers are arranged in deciduous catkins, and solitary at the base of the bracts, the male flowers having 2 or more stamens inserted under the disc. Fruit a 1-celled, many-seeded capsule, splitting by two revolute valves.

This order contains only the Willows and Poplars, most of which grow in the north temperate and Arctic regions.

SALIX (WILLOW).—A genus of trees and shrubs, sometimes with very dwarf subterraneous trunks and branches creeping along the surface of the ground. Leaves often narrow or small, entire or serrulate, feather-veined. Flower catkins usually erect with entire scales. Stamens 2 or 3, or more in a few species.

Culture and Propagation.—The Willows are beautiful and graceful plants for the garden when judiciously planted, so as not to interfere with the flower beds. Planted near water — lakes, streams, ponds &c.—they produce a fine effect and flourish better, perhaps, than in any other position. They are not particular as to locality, however, so long as they can strike their roots into damp and rather heavy soils. The dwarf creeping kinds are excellent for rambling over the stones in large rockeries.

The Willow is probably one of the easiest of plants to increase by cuttings. Pieces of the young and fairly well ripened stem will root readily at almost any time if just placed in the soil. When used as stakes for other plants, care ought to be taken that the bark should be peeled away from the portion that enters the soil or pot, as otherwise it will surely root if in a green state. The Weeping Willows are grafted or budded on standards of the common varieties. The bushy or creeping Willows like *herbacea*, *reticulata*, *Myrsinites*, *lanata*, *aurita*, *nigricans*, *repens* are useful for covering knolls or mounds. They are all natives of the British Islands, and are found among rocks and cliffs, by streams and rills. Similar situations in large gardens would be the most natural for them.

S. alba (*White Willow*). — A large native tree sometimes 80 ft. high, with narrow lance-shaped taper-pointed silky leaves 2–4 in. long. There are a few varieties, the best known being *cærulea*, with smooth glaucous leaves; and *vitellina*, the 'Golden Osier or Willow,' with reddish or yellowish twigs when young. Found in marshy ground in a wild state.

Culture &c. as above.

S. babylonica (*S. pendula*).—*Weeping Willow.*—A beautiful drooping species about 30 ft. high, native of the Levant, having narrow lance-shaped leaves 3–6 in. long, serrulate and tapering to a point, often glaucescent beneath. The variety *annularis* is remarkable for the peculiar ring-like twist of the leaves.

Culture &c. as above.

S. Caprea (*Common Sallow; Goat Willow* or '*Palm*'). — A pretty silvery tree found near streams throughout the British Islands. Leaves variable, elliptic or oblong obovate or lance-shaped acute, with silky hairs on the surface. The flowers are always at their best about Palm Sunday, and are often used in churches as a substitute for the real Palm. The 'Kilmarnock Weeping Willow' is a variety of this species called *pendula*, and is remarkable for its decidedly drooping character.

Culture &c. as above.

S. daphnoides (*S. acutifolia*).—*Violet Willow.* — A European tree or shrub

10–20 ft. high, now naturalised in parts of England, and remarkable for young violet twigs, which are furnished with narrow oblong or linear lance-shaped sharply serrate leaves 3–6 in. long, tapering to a point, and having a glaucous bloom.
Culture &c. as above.

S. fragilis (*Crack Willow; Withy*).—A native tree 80–90 ft. high, with yellow-brown twigs and lance-shaped tapering serrate leaves 3–6 in. long, pale or glaucous beneath, hairy when young. The variety *decipiens* has orange or crimson twigs, and rather smaller leaves. *S. russelliana* —the Bedford Willow—grows about 50 ft. high, and is considered to be a hybrid between *S. fragilis* and *S. alba*, but differs little from *fragilis* proper except in having narrower leaves.
Culture &c. as above.

S. laurina, a handsome tree 20–30 ft. high, found in various parts of England and Ireland, is considered to be a hybrid between *S. phylicifolia* and *S. Caprea*.
Culture &c. as above.

S. pentandra (*Bay-leaved Willow*).—A native shrub or tree 6–20 ft. high, remarkable for producing its flowers later than any other Willow, and each of these, as the specific name indicates, has 5 stamens. The leaves are elliptic or ovate, or obovate lance-shaped, tapering to a point, 1–4 in. long, glandularly serrulate, and sweet-scented.
Culture &c. as above.

S. phylicifolia (*Tea-leaved Willow*).—A handsome native bush about 10 ft. high, remarkable for its bright brown or reddish branches and shining green and glaucous leaves, which are ovate-oblong or elliptic lance-shaped in form. There are several varieties, one (*radicans*) being a more or less decumbent rooting form.
Culture &c. as above.

S. purpurea (*Purple Osier*).—An erect or decumbent British shrub, 5–10 ft. high, remarkable for its red or purplish bark. Leaves thin in texture, linear lance-shaped serrulate, 3–6 in. long, smooth when old, slightly hairy when young. *S. rubra* is a hybrid between this species and *S. viminalis*. Its variety *Helix*, the Rose Willow, is much affected with an insect which produces Rose galls.
Culture &c. as above.

S. triandra (*S. villarsiana*).—*Almond-leaved* or *French Willow*. — A British species usually found on river banks, Osier beds &c. It grows about 20 ft. high, and has flaking bark; leaves 2–4 in. long, linear or oblong lance-shaped tapering, glandular serrate, smooth shining green above, paler or glaucous beneath. Flowers from April to June, each male flower with 3 stamens. There are several forms—some with round, others with furrowed stems.
Culture &c. as above.

S. viminalis (*Osier*).—Grown naturally this native species grows about 30 ft. high. Its long straight branches look beautiful swaying in the breeze, especially when young and covered with a silvery silky down. Leaves 4–10 in. long, linear lance-shaped, with wavy margins.
Culture &c. as above.

POPULUS (POPLAR). — A genus of well-known deciduous trees with round or angled branches, often having scaly resinous buds. Leaves alternate, sometimes on laterally compressed tremulous stalks, usually broad, feather-veined and 3-nerved at the base, entire toothed or lobed; stipules narrow, membranous, fugacious. Catkins loose, usually drooping, and appearing before the leaves. Stamens 4–30. Female flowers sometimes on an elongated pedicle.

Culture and Propagation.—Poplars are ornamental and quick-growing trees, usually flourishing near streams, rivers or damp situations generally. All the species are easily increased by cuttings of the ripened shoots inserted in prepared beds in the open ground in either autumn or spring. Seeds may also be sown as soon as ripe in light soil, the seedlings being transplanted and receiving the same after-treatment as the Beech. Fresh plants can also be obtained by severing the suckers from the base and transplanting separately in autumn. The Weeping Poplars are usually grafted on tall straight stems of *P. grandidentata*.

P. alba (*P. nivea*). — *Abele; White Poplar*.—A beautiful quick-growing tree 60–100 ft. high, with grey smooth bark, and large deltoid-ovate lobed and toothed leaves 2–4 in. across, with long slender flattened stalks. The variety *bolleana* has a columnar or pyramidal habit; *canescens*, the Grey Poplar, is distinguished from the type by its smaller rarely lobed leaves covered with a greyish down.

Culture &c. as above. *P. alba* makes a fine shelter tree. Increased by suckers, shoot and root cuttings, and layers.

P. balsamifera (*Balsam Poplar; Balm of Gilead; Tacamahac*).—A fine N. American tree with round branches and large buds copiously coated with a fragrant resin. Leaves quite smooth, ovate, serrate, tapering to a fine point, whitish and reticulated beneath. The variety *candicans* (*P. ontariensis*), known as the Ontario Poplar, has broader and more or less heart-shaped serrate pointed leaves on usually hairy stalks, and grows 40–50 ft. high in this country. As its branches are remarkably brittle and easily broken by the wind, it should not be planted where exposed to strong gales; *laurifolia*, a Siberian tree, has oval oblong tapering toothed leaves; and *suaveolens* from the Rocky Mountains has broadly elliptic taper-pointed toothed leaves with slightly downy nerves and stalks.

Culture &c. as above.

P. deltoidea (*P. monilifera; P. canadensis*).—*Necklace* or *Carolina Poplar*.—An ornamental tree from N. America 80 ft. high or more, having sharply angled or winged branches, and remarkable for its large ovate heart-shaped or deltoid entire or bluntly serrate smooth and bright green leaves 6–9 in. long on young plants and suckers, but smaller on fully grown trees. The variety *aurea* is readily distinguished by the golden-yellow colour of the foliage.

Culture &c. as above.

P. grandidentata.—This species attains a height of 60 ft. or more in a wild state in N. America. It has roundish branches and downy, not resinous, buds. Leaves 1–3 in. long, roundish ovate, with large and irregular sinuate teeth, smooth on both sides when old, but densely covered with a white silky wood when young. The weeping variety called *pendula* is the one mostly seen.

Culture &c. as above.

P. nigra (*Black Poplar*).—A quick-growing tree, 50–60 ft. high, native of Europe and N. Asia, with smooth greenish-white branches, downy when young and more or less resinous, like the buds. Leaves 1–4 in. long, rhomboid deltoid or roundish, finely crenate serrate, with round angles, and a tapering apex, borne on slender flattened stalks. The variety *salicifolia* has narrow Willow-like leaves.

The Lombardy Poplar is a variety of the Black Poplar, and is recognised by its pyramidal Cypress-like habit. It attains a height of 100–150 ft., and is known botanically as *P. nigra pyramidalis* (*P. dilatata* and *P. fastigiata* being synonyms).

In the Botanic Garden at Dijon there is, or was some years ago, a specimen of the Black Poplar, said to be not less than 500 years old. It was over 130 ft. high, and the trunk had a girth of 50 ft. at the ground level.

Culture &c. as above.

P. tremula (*Aspen*).—A beautiful native tree, rarely exceeding 50 ft. high, distinguished by its grey bark and remarkable for the almost perpetual tremulous motion of its roundish heart-shaped entire or angularly toothed leaves, which are 1–4 in. long, smooth or silky beneath, and borne on very long slender flattened stalks. Flowers in March and April in cylindrical catkins 2–3 in. long, the male flowers having about 8 stamens. The variety *pendula* has drooping branches, and is usually grafted on tall stems of the Common Aspen.

Culture &c. as above.

P. tremuloides (*P. græca*).—*American Aspen*.—A North American tree 20–50 ft. high, with smooth branches and buds, the latter being more or less clammy. Leaves roundish heart-shaped, with a short sharp point and small regular teeth, and borne on slender flattened stalks. There is also a weeping form of this species.

Culture &c. as above.

CX. EMPETRACEÆ—Crowberry Order

A small order of Heath-like shrubs, with alternate, scattered or clustered, small linear or oblong, thickish leaves, no stipules, and small, 1-sexed or polygamous flowers in axillary clusters or terminal heads. Perianth segments 4–6, somewhat petaloid, and often in two rows. Stamens 2–3, very rarely 4. Fruit a roundish, fleshy drupe.

EMPETRUM (CROWBERRY or CRAKEBERRY).—A genus with only one species:—

E. nigrum.—A tufted native shrub with trailing Heath-like branches 6–18 in. long and crowded blunt linear oblong leaves turning red with age, and having the edges turned back so as to meet over the midrib beneath. Flowers from April to June, minute, sessile in the leaf-axils, with 6 reflexed pink perianth segments or petals and 3 stamens. Female flowers succeeded by brownish-black Juniper-like edible berries. The variety *rubrum*, from Chili, has brownish-purple flowers, and red berries or drupes.

Culture and Propagation.—The Crowberry is an ornamental evergreen suitable for parts of the rock garden with other dwarf shrubs of like character. It flourishes in damp peaty soil, and may be increased by inserting cuttings of the shoots in sandy soil under a handlight during the summer months, keeping them shaded and close for a short time.

Closely related to Empetrum is the genus COREMA, plants of which require the same cultural treatment. *C. album* (*Empetrum lusitanicum*) is a Portuguese bush about a foot high, with clusters of white flowers in spring. *C. Conradi* (*Empetrum Conradi*) from the United States is 6–9 in. high, with narrow linear leaves and white flowers produced in April.

Sub-Class II. MONOCOTYLEDONS

Division I. *PETALOIDEÆ* (p. 127). Series I. HYPOGYNÆ (p. 127).

CXI. NAIADACEÆ—Pondweed Order

An order of marsh or water plants with creeping roots and floating or submerged leaves. Flowers hermaphrodite, monœcious, or diœcious. Perianth segments none, or 2–4. Stamens usually 1–4.

APONOGETON distachyon (CAPE PONDWEED; WINTER HAWTHORN).—A charming S. African water plant with oblong lance-shaped floating leaves and branched spikes of white sweet-scented hermaphrodite flowers produced from the end of September to Christmas, and having 6 stamens and many carpels.

Culture and Propagation.—The Winter Hawthorn is quite hardy in the milder parts of the kingdom, and flourishes in ponds, lakes, streams, &c. The plants should be sunk about a foot below the surface of the water in pots or pans, so that the roots will be protected from frost. They may be divided after the leaves have withered when the roots are at rest. Seeds may also be sown as soon as ripe in sandy soil in pots and submerged in water. In the bleakest localities the plants may be grown in an ordinary room in a bell-glass, or in a tank in a cold greenhouse.

CXII. ALISMACEÆ—Water Plantain Order

A small order of water or marsh plants with simple radical leaves and leafless flower-scapes. Flowers hermaphrodite or unisexual, with an inferior perianth, all the segments of which, or only the 3 inner ones, are coloured. Stamens 6 or 9 or more.

ALISMA (WATER PLANTAIN).—A small genus of water or marsh perennials with parallel veined leaves, and flowers with 3 petals or segments, borne in whorls or umbels. Stamens 6.

A. natans (or *Elisma natans*) is a very rare British species with floating lance-shaped subulate leaves 2–3 in. long, and white flowers ½ in. across with yellow claws, borne in July and August, 2–3 together at the rooting joints of the floating stems, from which oblong elliptic leaves are produced.

Culture &c. as for *A. Plantago.*

A. Plantago (*Common Water Plantain*).—An ornamental British plant with erect, broadly lance-shaped leaves, 5–7-nerved, 6–8 in. long, and pink or rosy flowers about ½ in. across borne in panicles from June to August on stalks 1–3 ft. high.

Culture and Propagation.—Clumps of this plant on the edges of lakes, rivers, streams &c. look very pretty and have a decidedly attractive appearance. Once planted it will require no further attention, and will reproduce itself from seeds. It is very common along the banks of the Thames, and the leaves are freely eaten by swans.

A. ranunculoides.—A tufted native species with stalked and 3-ribbed leaves 2–3 in. long, erect and linear lance-shaped. The pale purple flowers, like those of *A. Plantago*, appear from May to September, borne 6–8 in umbels or whorls.

Culture &c. as above for *A. Plantago.*

SAGITTARIA (ARROWHEAD).—A genus of marsh or water plants closely related to the Water Plantains, from which they differ in having all unisexual flowers, borne in spikes, whorls or panicles. The elliptic lance-shaped or sagittate leaves have long and often thick stalks.

Culture and Propagation.—The hardy species may be grown in water or marshy soil near lakes, streams &c. in the same way as the Water Plantains, and may be increased by division. Seeds may also be sown when ripe in pots or pans of sandy soil half submerged in water. The seedlings are pricked out into similar soil in due course and may be again plunged in water and grown on until sturdy enough for the open air. The double-flowered variety can only be increased by division, as it rarely or never produces any seed.

S. heterophylla.—An attractive North American marsh plant 2–2½ ft. high with long-stalked bluntly triangular leaves having 2 pointed lobes at the base. The pure white flowers about 1½ in. across appear in August, and are borne in whorls of 3 on the upper portion of the scape, the bunch of bright yellow stamens in the centre being very conspicuous.

Culture &c. as above.

S. sagittifolia.—An ornamental native water plant with stolon-bearing stems, swollen at the base, and bright green hastate or arrow-shaped leaves 2–8 in. long, with stout 3-sided stalks 12–18 in. long. The white flowers with purple claws and anthers are about ½ in. across, and are borne from July to September in distant whorls on scapes 1–2 ft. high. The double-flowered variety, which is sometimes called *japonica flore pleno*, is a very handsome plant with roundish heads of white flowers, borne on purplish pedicels over 1 in. long.

Culture &c. as above.

S. sinensis (*S. gigantea; S. lancifolia*).—A beautiful Chinese aquatic or marsh plant with long-stalked lance-shaped leaves about 3 ft. high altogether. The stem reaches a height of about 4½ ft. and the flowers are borne in clusters or whorls of three on the upper portion. The outer segments of the perianth are greenish flushed with rose, the 3 inner oval roundish ones being much larger and of a pure white, with a cluster of yellow stamens in the centre.

Culture &c. as above.

BUTOMUS (FLOWERING RUSH).—*B. umbellatus* is a beautiful native marsh plant with a creeping rootstock and slender erect 3-sided leaves 3–4 ft. long, sheathed at the base. In June and July the beautiful rosy-lilac flowers about 1 in. across are borne in umbels, each blossom consisting of 6 oblong segments, 9 stamens, and 6 beaked reddish carpels, the latter being united at the base.

Culture and Propagation.—This plant flourishes in mud by the margins of streams, ponds &c. in open sunny situations, and may be regarded as one of our most ornamental water plants. Although it is usually increased by division of the rootstocks in spring, seeds may also be sown when ripe, and treated in the same way as those of the Arrowheads mentioned above.

LIMNOCHARIS.—A genus with 3 or 4 species of smooth marshy or aquatic plants with tuberous rootstocks, and elliptic lance-shaped or ovate heart-shaped leaves having long thickened stalks. Flowers hermaphrodite, yellow, borne in umbels on a short scape, and having 6 segments, the 3 inner ones of which are larger than the 3 outer ones. Stamens as many as 20, hypogynous. Ovary with 15–20 distinct carpels.

L. Humboldti (*Hydrocleis Commersoni*).—A pretty little water plant, native of Buenos Ayres, having whitish cylindrical rhizomes and broadly oval or roundish leaves, which float on the surface of the water. Flowers from July to September, over 2 in. across, with 3 bright yellow roundish inner segments, and 3 smaller green outer ones, and numerous orange-yellow stamens in the centre.

Culture and Propagation. — This pretty plant flourishes in still or running water, and to prevent its being frozen in winter the creeping rhizomes should be planted in the mud about 9-12 in. below the surface of the water. Or they may be grown in pots or tubs, which can be sunk from June to the end of September out of doors, afterwards lifting them in the event of frost and placing them in a cold frame or greenhouse until the following year. The easiest way to increase the plants is by dividing the roots in spring.

CXIII. COMMELINACEÆ—Spider Wort Order

A rather large order of herbaceous plants with trailing, ascending, or erect stems, and linear or lance-shaped flat and usually sheathing leaves. Flowers regular or slightly irregular, hermaphrodite, in spikes or umbels. Perianth inferior, consisting of 3 outer sepal-like and 3 inner petaloid segments. Stamens 6, or fewer by abortion, hypogynous, or attached to the throat of the corolla, sometimes only 3 perfect, the others reduced to staminodes. Ovary superior, 3 or sometimes 2-celled. Fruit a few-seeded capsule.

There are 25 genera containing about 300 species in this order, but most of them are natives of the warmer parts of the globe, and unfit for outdoor cultivation in the British Islands. The genera and species described below are best known.

COMMELINA. — A genus of herbaceous perennials with weak, creeping, ascending or erect stems, and ovate lance-shaped or linear leaves, sessile and sheathing or shortly stalked. The blue, yellowish or white flowers usually have only 3 perfect stamens, the others being reduced to staminodes.

Culture and Propagation.—About 90 species are known, but the following are the only ones at all hardy in our climate. They flourish in light warm well-drained soils, and in cold parts of the country require a protection of leaves or ashes &c. over the crowns in severe winters. They may be increased by seeds sown in gentle heat in spring, the seedlings being planted out about June, to flower in August and September. The tufts may also be divided in early spring and replanted, or the fleshy roots may be lifted in autumn and stored like Dahlias during the winter, and divided at planting time in spring.

C. cœlestis (*C. tuberosa*).—A beautiful herbaceous perennial about 18 in. high, native of Mexico, with fleshy roots and oblong lance-shaped leaves having ciliated sheaths. The bright blue flowers appear in June and July, borne on downy stalks, issuing from heart-shaped taper-pointed spathes folded together. The variety *alba* differs only in its white flowers. This plant and its white variety look well planted in masses in warm borders. The variegated form has flowers striped with blue and white.

Culture &c. as above.

TRADESCANTIA (Spider Wort). A closely related genus of tufted or creeping herbaceous perennials, with simple or branched stems, variable leaves, and flowers in terminal sessile or stalked umbels. The perianth consists of 3 outer distinct concave, green or coloured sepal-like segments, and three inner obovate or roundish petal-like ones. Stamens 6, all usually perfect, with bearded or naked filaments. Capsule 3-celled.

T. virginiana.—A beautiful herbaceous perennial native of the United States, with stems 6–24 in. high, and linear purple-veined leaves, broadest at the base, and somewhat ciliated on the margins. The deep violet-blue flowers, with conspicuous yellow anthers in the centre, appear from March to May, in umbels at the tops of the branched stems. There are several forms of this species distinguished by the colour of the flowers, which are red, white, rosy, bright blue, and deep violet. There is also a form with deep violet double flowers.

Culture and Propagation. — These plants are easily grown in any good garden soil in open sunny situations and may be massed in the border, shrubbery, or rock garden, and also in rougher parts of the garden. They are easily increased in autumn or early spring simply by dividing the tufts.

CXIV. LILIACEÆ—Lily Order

A large order of herbaceous perennial, rarely annual shrubs or trees, having bulbous, tuberous, fascicled or creeping rootstocks, herbaceous or woody stems, and polymorphous cauline or radical leaves with usually parallel veins, rarely net-veined. Inflorescence mostly terminal, solitary, racemose, spiked, umbellate or capitate, rarely panicled, furnished with scarious or spathe-like bracts. Flowers hermaphrodite or rarely one-sexed by abortion, regular or rarely irregular. Perianth inferior, usually composed of 6 almost equal segments, very rarely 4, 8 or more, more or less distinctly in 2 circles, free, or very rarely united at the very base. Stamens usually 6, hypogynous or attached to the perianth lobes. Styles usually united at the top. Fruit superior, 3-celled, berry-like or fleshy, many-seeded.

This order contains over 2,000 species, a large number of which are remarkable for the size, beauty, and colour of their flowers. They are distributed over temperate and tropical parts of the world.

SMILAX (American China Root). A genus of trailing or climbing shrubs with alternate, distichous, or rarely opposite, often perennial leaves, 3–5-nerved, the stalks of which are often furnished with two tendrils. Flowers small, more or less yellowish-green, diœcious, in axillary clusters or umbels. Perianth inferior, 6-parted, with similar segments. Male flowers with 6 stamens. Female flowers with 6 or fewer staminodes.

Culture and Propagation. — These plants may be used in much the same way as Ivy, and are more valuable for appearance and foliage than for their flowers. The climbing kinds are excellent for clothing walls, or for rambling over boulders, ruins, old tree trunks, &c., and always thrive best in warm sunny positions where the growths can be ripened and hardened by the sunshine. They flourish in a rather dry sandy loam and may be increased by seeds, layers, and division of the roots. It may be remarked that, as the male and female flowers are borne on separate plants (diœcious), seeds will only be found on plants bearing female flowers, but they must be fertilised by pollen from the male flowers, otherwise they will remain barren. Cuttings of the ripened or half-ripened shoots will root under a hand light or on a gentle hotbed in summer and autumn, if kept close and shaded for some time. They are, however, sometimes difficult to root.

S. aspera (*Prickly Ivy*). — A trailing S. European evergreen species with prickly stems 5–10 ft. long, and ovate or lance-shaped, cordate, spiny-toothed, leathery leaves, 7-9-nerved, and sometimes spotted with white as in the variety *maculata*. Flowers appear in July, sweet-scented, whitish or flesh-coloured, followed by red berries. The variety *mauritanica* is a quick-growing climber with greenish-yellow flowers and angular stems. It is scarcely suitable, however, for the open air except in the mildest parts of the country. *Buchananiana* is a distinct form with long leaves with bristly hairs on the margins.

Culture &c. as above.

S. australis (*S. latifolia*).—A more or less prickly-stemmed Australian species 3-5 ft. high, with leaves 2-4 in. long, varying in shape from ovate lance-shaped to oblong or nearly round, and having short twisted stalks. Flowers in summer, white, pale green, or purplish.

Culture &c. as above.

S. Bona-nox.—A N. American species 5–10 ft. high, with tuberous roots and round or somewhat 4-angled branches and stems more or less armed with small rigid prickles. The leaves which are slowly deciduous vary in shape from roundish-cordate to fiddle or halberd shape, or 3-lobed, shining green on both sides, and often bristly or spiny on the margins. The greenish-white flowers appear in June and July.

Culture &c. as above.

S. Cantab. — This ornamental evergreen climber has been grown for many years at the Cambridge Botanic Garden, but as it seems to be distinct from all other species in cultivation it has been named as a new Smilax by Mr. Lynch, the Curator. It has strong shoots, 12 ft. or more in length, and armed with straight green prickles about ⅜ in. long, the slender and nearly 4-angled branches being usually without prickles. The papery leaves are almost heart-shaped deltoid in shape and about 5 in. long by 5½ in. in breadth, with 5 nerves and a few grey spots on the upper surface. The male flowers are sweet-scented and produced in umbels of 8–12, but like most of the other kinds are not showy.

Culture &c. as above.

S. China.—This species is a native of China and Japan, and has large and eatable fleshy roots. The roundish stems are furnished with a few strong and somewhat recurved spines, and the roundish-ovate glossy green leaves are deciduous in winter.

Culture &c. as above.

S. excelsa. — A tall-growing species, native of S. Europe, Asia Minor, &c., with more or less 4-angled stems and branches and broadly ovate acute leaves, somewhat heart-shaped at the base and 7-nerved, the leaf-stalks being sparsely prickled and the margins finely toothed. The female flowers are succeeded by red berries in autumn.

Culture &c. as above.

S. glauca.—A North American species about 3 ft. high with round stems, but angled branches and twigs more or less covered with rather stout prickles. The ovate acute leaves are slowly deciduous, usually green above and glaucous beneath.

Culture &c. as above.

S. herbacea (*Carrion Flower*). — A N. American species with herbaceous erect and recurved or climbing stems without prickles, and smooth long-stalked ovate-oblong or heart-shaped leaves. About June 20–40 flowers appear and have a peculiar carrion-like odour.

Culture &c. as above.

S. hispida.—A distinct N. American species recognised by the stems being covered with dense stiffish hairs and slender straight prickles. The thin green leaves are more or less ovate in outline, with finely toothed edges and 7 or more conspicuous nerves.

Culture &c. as above.

S. laurifolia. — A tall-growing North American evergreen climber with round prickly stems and angled non-prickly shoots. The plant is easily recognised by its bright green leathery and Laurel-like leaves, elliptic or oblong-lance-shaped in outline, with 3 nerves.

Culture &c. as above.

S. pseudo-China.—A North American species with straight needle-like prickles on the lower part of the stems, the upper portion and the branches being mostly without prickles. The ovate 7–9-nerved leaves are narrowed about the middle or lobed at the base, and become more or less leathery in texture with age. The greenish flowers are succeeded by black berries on the female plants.

Culture &c. as above.

S. rotundifolia (*S. quadrangularis*).—*Green Briar.*—A prickly-stemmed North American climber, with thin, roundish, ovate or heart-shaped leaves, 2–4 in. long, abruptly pointed at the apex, and greenish flowers borne in June on flattened stalks, succeeded by round bluish-black berries.

Culture &c. as above.

S. tamnoides.—A vigorous N. American climber with nearly ovate leaves, and somewhat resembling in appearance *S. aspera*, but without the heart-shaped base to the leaves. In the autumn numerous clusters of black berries appear on the female plants.

Culture &c. as above.

S. Walteri.—This is also a native of N. America, with angled prickly stems and branches usually without prickles. The leaves are more or less ovate-lance-shaped or somewhat cordate, and in favourable seasons the female plants produce scarlet berries.

Culture &c. as above.

RUSCUS (Butcher's Broom).—A genus containing 2 or 3 species of perennial plants with erect branched and rather woody stems, bearing alternate or scattered stiff leathery leaf-like bodies called 'cladodes'—really flattened branches. Flowers small, diœcious, usually on the upper surface of the cladodes; segments distinct, the 3 outer ovate ones much larger than the 3 inner ones. Fruit a round, pulpy, indehiscent berry.

Culture and Propagation. — These plants thrive in ordinary garden soil, and are useful for planting under trees or the margins of shrubberies where little else will grow. They may be increased by detaching and replanting suckers from the roots. Also by layering the shoots and by seeds when obtainable.

R. aculeatus (*Common Butcher's Broom*).—A native of the British Islands, occasionally found in copses and woods, having tufted, branched, erect angled stems 1-2 ft. high, and 'cladodes' ½–1½ in. long, twisted at the base, ovate and rather spiny. The small greenish-white flowers appear from February to April (the male ones being on the narrower cladodes), and are succeeded by bright red, rarely yellow berries, about the size of peas.

Culture &c. as above.

R. Hypophyllum (*Double Tongue*).—A native of S. Europe 1–1½ ft. high, with more or less oblong lance-shaped cladodes 3–5 in. long, the upper ones alternate, the lower ones opposite, or 3 or more in a whorl, distinctly ribbed. Flowers in May and June, 5–6 in a cluster in the middle of the lower cladodes. Berries bright red, ½–¾ in. in diameter. *R. Hypoglossum* is a form of this species.

Culture &c. as above.

DANÆA.—A genus containing only one species:—

D. Laurus (*Ruscus racemosus*).—*Alexandrian Laurel.*—A graceful Portuguese evergreen shrub, about 4 ft. high, with smooth shining green, broadly lance-shaped, leathery cladodes about 2 in. long. The greenish-yellow flowers which appear in May differ from those of the Butcher's Brooms in being hermaphrodite, and produced at the ends of the cladodes. The round, red, leathery berries have a white disc at the base.

Culture and Propagation. — This species does best in deep loamy soil, and likes a little sunshine, although it is a good plant for shady places. It may be increased by suckers, layers, or seeds, in the same way as Ruscus.

PHILESIA.—A genus with only one species:—

P. buxifolia. — A charming Chilian shrub, about 4 ft. high, with alternate, shortly stalked, oblong, leathery leaves, revolute on the margins. The beautiful drooping Lapageria-like blossoms are about 2 in. long, narrowly funnel- or bell-shaped, and of a deep rosy-red. The three inner segments of the perianth are much longer than the three outer ones. Stamens 6, hypogynous.

Culture and Propagation. — In the favoured parts of the south of England and Ireland this remarkable plant may be grown out of doors, but it should always have a chosen and sheltered spot. It grows very slowly, and seems to succeed best in well-drained sandy peat. It may be increased by separating the suckers from the base, but it is not wise to do this unless the plants have made good clumps.

In connection with this species may be mentioned a remarkable hybrid called *Philageria Veitchi.* It was raised in 1872 by fertilising *Lapageria alba* with the pollen of *Philesia buxifolia.* The result was a plant almost intermediate in character, with rambling shrubby stems, and drooping rosy flowers, in which the 3 outer boat-shaped, fleshy segments are about half as long as the 3 inner broadly ovate ones. Unfortunately this hybrid flowers very rarely, and as it is extremely slow-growing is not likely to become generally grown for many years at least. I have seen it in flower about three times. It would probably grow under the same conditions as *Philesia* in the open air in the mildest parts of the kingdom, but is safer grown in a cold greenhouse. The same remarks apply to the beautiful *Lapageria alba* and *rosea*, which in warm-sheltered gardens by the sea coast in Cornwall often produce their white or red tubular blooms freely at Christmas.

LUZURIAGA.—A genus with 2 or 3 species of undershrubs with almost stalkless alternate oblong or elliptic leaves, with 3 or more prominent nerves. Flowers white, solitary or few. Perianth segments free, spreading, spotted. Stamens 6, hypogynous; ovary 3-celled, becoming a roundish indehiscent berry when ripe.

L. radicans.—A distinct Chilian evergreen bush 1–2 ft. high, with slender thread-like stems, and smooth ovate lance-shaped stalkless leaves. Flowers pure white, about 2 in. across, with spreading segments, and golden-yellow anthers united into a cone in the centre.

Culture and Propagation.—This plant is fairly hardy in the neighbourhood of London, but is more suitable for outdoor cultivation in the mildest parts of the south and west. It likes a sandy peat in sheltered places, and may be grown in the rock garden or in front of such shrubs as Rhododendrons, Kalmias, and other peat-loving plants of the Heath order.

POLYGONATUM (Solomon's Seal). A genus containing more than 20 species of ornamental herbaceous plants, having horizontally creeping fleshy rootstocks, ending in a stalk which ascends and bears ovate lance-shaped or linear, alternate, opposite, or verticillate leaves. Flowers nodding or drooping, solitary in the leaf-axils, or often in short loose racemes or umbels on short stalks. Perianth tubular or somewhat bell-shaped, with short, spreading-erect, nearly equal lobes. Stamens 6, enclosed. Fruit a 2–4-seeded roundish pulpy berry.

Culture and Propagation. — Polygonatums have obtained the popular name of 'Solomon's Seal' from the circular depressed scar left on the creeping rootstock after the leaf and flower-stems have disappeared. All the cultivated species are hardy, and flourish in any ordinary good garden soil, although they prefer a fairly rich sandy loam. For the decoration of shaded parts of the flower border, rockeries, under tall deciduous trees, they are very appropriate, and look handsome when grown in large masses. In a cut state the leaves and flowers remain fresh a long time, and the buds will expand after being cut.

Plants are easily increased at the end of summer when the foliage has withered, or in early spring, simply by dividing the rootstocks, taking care in the process that each portion is furnished with a terminal bud, from which the season's growth is to develop.

Seeds may also be sown, as soon as ripe and freed from the pulp, in fine sandy loam and leaf-soil in pots or pans. They will sprout the following spring, and should be grown on in the seed-boxes for at least one season before planting out. It is rather a slow process obtaining plants from seeds, and division of the rootstocks is the method usually employed.

P. biflorum. — A pretty Canadian species with slender stems 1–3 ft. high, and almost sessile, ovate or lance-shaped leaves, usually somewhat downy on the veins, and pale or glaucous-green beneath. The greenish-white flowers are borne in May, usually two together, but sometimes three, drooping in the leaf-axils.

Culture &c. as above.

P. japonicum. — A Japanese species 1–2 ft. high, with leathery, oblong leaves 2–3 in. long, somewhat glaucous, especially on the under surface. The drooping white flowers, ½–¾ in. long, slightly tinged with purple, are produced in April 1–3 together in the axils of the leaves.

Culture &c. as above.

P. latifolium. — A vigorous plant, native of Central Europe, and apparently intermediate in character between *P. multiflorum* and *P. officinale.* It has arching stems 2–4 ft. high, and broad bright green leaves. The greenish-white flowers appear in July, 2–5 together, drooping from the leaf-axils. The variety *commutatum*, from N. America, reaches a height of 6–7 ft., and has 3–10 large white flowers in a cluster.

Culture &c. as above.

P. multiflorum (*Convallaria multiflora*).—*David's Harp; Lady's Seal.*—This is the Common Solomon's Seal occasionally found wild in British and Irish woods, but also distributed throughout temperate Europe. Its arching stems grow 2–3 ft. high, naked below, and furnished on the upper two-thirds with shortly stalked, oblong, stem-clasping leaves 3–5 in. long. The greenish-white flowers, about 1 in. long, appear in May and June, drooping in clusters of 2–5 on a stalk, from the leaf-axils. They are succeeded by bluish-black berries about ⅓ in. in diameter.

There are several forms of this species, including the rare double-flowered one (*flore pleno*); the silvery-variegated one (*striatum*); and *roseum*, a form with rosy flowers, native of the Altai Mountains. The variety *Broteri* resembles the type, but has larger flowers; and *bracteatum* is recognised by its well-developed bracts, and its later flowering.

P. multiflorum is a popular plant for forcing into bloom early in greenhouses. The rootstocks are potted after the outdoor flowering period is over, and kept in the ground until early the following year, when they are transferred to a warm greenhouse.

Culture &c. as above.

P. officinale (*P. vulgare; Convallaria Polygonatum*).—A pretty species occasionally found wild on wooded limestone cliffs. It has angled, arched stems 6–12 in. high, with alternate, oblong, half stem-clasping leaves 3–4 in. long. The greenish-white flowers, about 1 in. long, are usually solitary in the axils of the leaves in May and June, and are replaced later on by bluish-black berries about ¼ in. through. There is a taller Japanese form called *macranthum*, which has larger flowers.

Culture &c. as above.

P. oppositifolium (*Convallaria oppositifolia*).—A beautiful Himalayan species 2–4 ft. high, with opposite, shortly stalked, oblong, taper-pointed leaves. The flowers appear in April and May, drooping in opposite corymbs, and are greenish-white ribbed with red. The variety *albo-vittatum* has red stems and leaves striped with ivory or yellowish-white. After the flowers have disappeared they are replaced by scarlet berries.

This was at one time considered too tender for the outdoor garden, but it is hardy enough in southern districts in warm sheltered positions. In colder places a covering of leaves or litter during the winter would protect it against injury.

Culture &c. as above.

P. punctatum.—This is also a native of the Himalayas, where it is found at an elevation of 7000–11,000 ft., thus bringing it within the range of our outdoor climate. It has angular furrowed stems 1–2 ft. high, bearing oblong-lance-shaped leaves 2–3 in. long, all ascending, and usually opposite each other. The greenish-white flowers appear in May and June, 2–3 in a cluster, and are dotted with lilac.

Culture &c. as above. May be treated like *P. oppositifolium*.

P. roseum.—A handsome but variable species from Central Siberia with furrowed stems 2–3 ft. high, and ascending linear or lance-shaped leaves 3–5 in. long, the upper ones opposite or in whorls of three or more. The cylindrical rosy flowers, about ½ in. long, appear in pairs from the axils of the leaves in May and June, and are a contrast to the green foliage.

Culture &c. as above.

P. verticillatum (*Convallaria verticillata*).—A rare British species with angled stems 2–3 ft. high, bearing whorls of 3–6 ascending, narrow, lance-shaped, sessile leaves with ciliolate margins and veins. The greenish flowers, about ⅓ in. long, appear in June and July, and are constricted in the middle, giving place to red berries about ¼ in. in diameter later on.

Culture &c. as above.

SMILACINA (False Solomon's Seal).—A genus of herbaceous perennials having slender creeping, or short, thick, knotted rootstocks, and erect stems with alternate shortly stalked ovate-lance-shaped or rarely narrow, never heart-shaped, leaves. Flowers small on short pedicels. Perianth with almost equal spreading segments, distinct or slightly united at the very base. Stamens 6, hypogynous, attached at the base of the perianth. Fruit a round pulpy berry, containing a few seeds, often only one.

Culture and Propagation.—Out of about 20 species those described below are the ones chiefly met with in gardens. They flourish under the same conditions as the ordinary Solomon's Seal, and may be likewise increased by dividing the rootstocks in late summer or early spring. They should not however be disturbed unnecessarily, but if left too long in one place require surfacing or mulching with fresh soil or well-decomposed manure so that the roots may thus obtain a fresh supply of food.

S. oleracea (*Tovaria oleracea*).—A distinct species from the Sikkim Himalayas, with more or less erect simple stems about 4 ft. high, and oblong taper-pointed leaves 6–7 in. long, slightly downy beneath. The roundish white flowers tinged with rose are about ¼ in. long and broad, and appear in May and June in terminal panicles, each one borne on deflexed or ascending pedicels about ¼ in. long. The specific name *oleracea* refers to the fact that the natives of Sikkim use the young flower-heads in their green sheaths as a pot herb.

Culture &c. as above. It grows best in a mixture of sandy peat and loam in partially shaded and sheltered spots.

S. racemosa (*Convallaria racemosa*). *False Spikenard.*—A North American species 2–8 ft. high, with oblong or lance-shaped ascending leaves 8-9 in. long, pale green and somewhat downy beneath. The small whitish flowers are borne in dense panicles in May and June.

Culture &c. as above.

S. stellata (*Convallaria stellata*).—A native of N.W. America 1-2 ft. high, with oblong or lance-shaped leaves 2–6 in. long, sessile and half stem-clasping, glaucous and somewhat downy beneath. The small white starry flowers are borne in dense racemes in May, and have earned for the plant the popular name of 'Star-flowered Lily of the Valley.'

Culture &c. as above.

MAIANTHEMUM (Twin-leaved Lily of the Valley).—A genus containing only the following species:—

M. Convallaria (*M. bifolium; Convallaria bifolia; Smilacina bifolia; S. canadensis*).—A very rare British plant, but also found throughout the north temperate regions of the Old and New World. It grows 4–8 in. high, having slender creeping rootstocks and flexuous stems, furnished with a pair of alternate, broadly ovate, heart-shaped, stalked leaves 2–8 in. long, deeply lobed at the base, thickly nerved. The small white sweetly scented flowers ¼ in. across appear in May and June in rather dense erect racemes, and are remarkable for having only 4 free oblong spreading segments, and 4 hypogynous stamens. They are succeeded by roundish white dotted berries about the size of a small pea.

Culture and Propagation.—This plant is suitable for the rock garden in more or less shaded spots in fairly good soil. It may be increased by dividing the creeping rootstocks.

CONVALLARIA (Lily of the Valley).—This genus also consists of a single species:—

C. majalis.—The characters of this charming and well-known native plant are a creeping underground rootstock from which arise 2 ovate lance-shaped leaves 6–8 in. long, with slender sheathing stalks. In May and June an angular lateral scape 6–10 in. long appears, with a terminal raceme of pretty drooping broad roundish bell-shaped flowers, having 6 short recurved or spreading lobes or teeth, and emitting a delightful fragrance. If allowed to persist they are likely to be succeeded by round red berries as large as peas.

There are several forms of the Lily of the Valley differing chiefly in the size and number of the flowers, or 'bells' as gardeners call them, borne on the stalks. What are known as the Berlin or German Lilies of the Valley are in greater demand for forcing than are the Dutch varieties. Among the single-flowered forms may be mentioned *Fortin's* variety which has fine foliage and tall spikes with large bells of flowers; the *Victoria* variety is a splendid form in the same way; *prolificans* is a new form found in a private garden in Italy by the late Dr. von Regel. It has large white flowers flushed with pink inside, borne on erect branching panicles 2 ft. or more high, and very fragrant; *rosea* has rose-tinted flowers, and there is also a double rose form, but neither is so charming as the white varieties, among which is one having the leaves striped with gold. The double-flowered Lily of the Valley (*flore pleno*) is by no means an improvement on the single-flowered one, although the flowers last well when cut.

Culture and Propagation.—Lilies of the Valley are fairly easy to grow well, and they repay for any little attention and good treatment they receive. They prefer a rich sandy well-drained loam, enriched with manure and decayed leaves, and always succeed best in moist shaded positions such as under a north or west wall or in any shady place with good soil and plenty of air overhead.

About the middle or end of September is the best time to plant Lilies of the Valley. Strong plump well-ripened 'crowns' should be selected if bloom is required the following season. When the young slender crowns or rhizomes are used they take a couple of years to reach the flowering stage. The crowns should be 2–8 in. apart or even more. Fine rich soil should be carefully worked in between and over them, and the bed may afterwards receive a layer of well-rotted manure. For three or four years the beds need not be disturbed, but if strong flower spikes are required the beds should get a liberal dressing of manure every autumn or winter, and when the leaves are growing quickly waterings with liquid manure will also be very beneficial. When it is desired to increase the stock the rhizomes have simply to be lifted in September, divided, or rather separated, and replanted singly.

At the time of flowering the colour and size of the blossoms can be greatly improved if they can in any way be protected from the weather. Old lights or even a piece of thin canvas stretched on pieces of wood placed over the flowers will prevent them from being spoiled, and they will look far whiter and purer in colour than those left uncovered in any way to the rain and wind. When picking the flower-stems they may be easily detached by a rather sharp vertical pull. The leaves, if possible, should not be picked, as they are required to manufacture food (as explained at p. 34) for storing up in the underground rootstocks. When leaves must be picked only one from each crown should be taken, so that the remaining one may carry on the work of nutrition.

Of late years a vast number of crowns of Lily of the Valley are prevented from starting into growth naturally in spring. They are carefully packed in fine sand or sandy soil and placed in refrigerators in which the temperature is kept a few degrees below freezing point. This being too cold for growth the buds remain dormant as long as the grower likes to keep them in that condition. About June and July when the naturally flowered Lilies of the Valley are over, those which have been prevented from growing, or 're-tarded' as it is called, are taken out, and if planted in ordinary soil in pots, will flower in a few weeks beautifully, even in an ordinary well-lighted room, as well as in the greenhouse. They are of course watered and treated in the usual way. In this way Lilies of the Valley are now to be found in bloom almost the whole year round.

The 'forcing' of Lilies of the Valley with great heat in winter is just the opposite process to retarding in summer, and scarcely comes within the scope of this work. It may, however, be mentioned that the crowns after being planted in pots or boxes and plunged outside for a week to start the roots are placed in the dark with plenty of moisture, and great heat, 80–100 degrees Fahr. day and night. After the leaves have grown a couple of inches, they are of a very pale green owing to the absence of light. They may then be given light, but every day the plants should be drenched with water about the same temperature as the house in which they are growing until the flowers begin to open. In this way Lilies of the Valley can be forced into flower from December to the end of March in about 21–25 days.

Where a good hotbed exists and can be kept dark, forcing Lilies of the Valley may be attempted. When grown in pots, the crowns may be kept dark by means of an inverted pot. All the plants need not be put into heat at once, so as to have a longer period of flowering.

REINECKIA. — A genus with only one species:—

R. carnea.—A Chinese and Japanese perennial with creeping rhizomes and tufts of smooth linear lance-shaped acute leaves 6–12 in. long. The flesh-coloured sweet-scented flowers appear in April and are borne in simple spikes arising from the centre of the leaves. The tubular perianth has 6 oblong acute segments, 6 stamens, and a 3-celled ovary.

The variety *variegata* has the leaves beautifully striped with green and yellowish-white.

Culture and Propagation.—This plant flourishes in ordinary garden soil, and although the individual flowers are not particularly showy, they are effective when the plants are grown in bold masses. The variegated form is the better garden plant and like the green-leaved variety may be readily increased by dividing the rootstocks in early autumn.

ROHDEA.—A genus with only one species:—

R. japonica. — A distinct Japanese plant 12–18 in. high, with short thick rootstocks and tufts of large radical leathery leaves, more or less lance-shaped in outline and strongly ribbed. In the most favoured parts of the kingdom the white flowers appear in the early months of the year, and are borne in dense spikes or clusters. The roundish bell-shaped perianth has 6 short broad lobes, 6 stamens, and a roundish 3-celled ovary which eventually becomes a 1-seeded indehiscent berry.

The variety *variegata* has leaves striped with green and white.

Culture and Propagation.—This is practically the same as for *Reineckia carnea* above.

HEMEROCALLIS (Day Lily).—A genus of ornamental herbaceous plants having a very short rhizome with numerous more or less thick and fleshy roots, and long narrow often almost grass-like radical leaves. Flowers in short irregular panicles or clustered heads. Perianth funnel-shaped with a cylindrical short or longish tube, and 6 much longer oblong spoon-shaped, erect-spreading, many-nerved lobes or segments. Stamens 6, shorter than the segments, declinate. Capsule leathery, oblong, or roundish, triquetrous.

Culture and Propagation.—The bold outlines of the foliage and the trusses of yellow or tawny flowers make the Day Lilies excellent plants for massing in the flower border, shrubbery, or rock garden. They delight in partially shaded spots, and by the margins of lakes, streams &c. they are particularly effective. They succeed in almost any ordinary garden soil, but prefer a deep rich loam which may be well manured some weeks before planting. The best time for carrying out this work is in early autumn as soon as the leaves have withered. The plants may at this period also be divided to increase the stock, but once placed in position are as a rule best left undisturbed for three or four years, by the end of which they will have made grand masses, and may be again divided, allowing a distance of 12–18 in. between the plants according to the vigour of the kind.

Seeds may also be sown as soon as ripe in autumn or in spring in cold frames. The seedlings are pricked out and grown on until large enough for planting out either in late September or March and April according to the date of sowing.

Although the flowers continue to appear for several weeks, the individual blossoms last only a day or two in a fresh expanded state; hence the popular English name, 'Day Lily,' which is a free translation of the Greek Hemerocallis, meaning 'Beauty of a Day.'

H. aurantiaca major.—This Japanese Day Lily is considered to be the finest of all. It is closely related to *H. fulva*, having masses of vigorous deep green leaves with a more or less glaucous bloom, and large wide open flowers of a rich apricot colour.

Culture &c. as above.

H. Dumortieri (*H. rutilans; H. Sieboldi*).—A fine species 12–18 in. high, native of Japan and Eastern Siberia, having long narrow tapering leaves and 1–4 large orange-yellow flowers, tinged with brown outside, borne on tall erect scapes about 2 ft. high in early summer.

Culture &c. as above. This species should not be allowed to remain more than a couple of years without dividing. The younger plants are more vigorous than the old ones.

H. flava.—This species has a wide range of distribution from Central and South Europe westwards to Siberia and Japan. It grows 2-3 ft. high, having strong tufts of narrow deep green leaves, keeled behind, and over 2 ft. long. The sweet-scented orange-yellow flowers, with flat veinless segments, are produced in June and July in large clusters, and have a showy and distinct appearance. It increases rapidly and is an excellent plant for naturalising in grassland &c.

Culture &c. as above.

H. fulva.—This species also extends across Europe to Japan like *H. flava*, and grows 2–4 ft. high, having long, broad, keeled leaves in large tufts. The large tawny-yellow flowers, about 4 in. across, appear in June and July in loose clusters, having almost blunt segments.

There are several forms of this species, among which may be mentioned *angustifolia* (or *longituba*) with narrow leaves; *crocea*, with yellow flowers; *disticha*, a well-known plant, once considered a distinct species, having flower stems branched near the top and bearing trusses of yellow flowers suffused with red within; *Kwanso* is a variety with large double bronzy orange-coloured flowers, and there is also a form of it with handsome variegated foliage. The variety *flore pleno* is a handsome form with double orange and crimson flowers borne in July.

Culture &c. as above. *H. fulva* is a more vigorous plant than *H. flava*, and may be used in many ways in large masses for effect. It is of a very variable character, as may be gathered from the varieties enumerated.

H. Middendorfi. — A handsome Day Lily, native of Siberia and Japan, and somewhat resembling *H. Dumortieri.* It has, however, broader leaves, more or less gracefully recurving, and its paler golden-yellow funnel-shaped blossoms are borne 2–3 together on tall scapes well above the foliage in summer.

Culture &c. as above.

H. minor (*H. graminea*).—A distinct and beautiful dwarf species 4–8 in. high, native of Siberia, N. China, and Japan, and readily recognised by its very narrow, keeled and pointed grassy leaves of a bright green colour. The fragrant yellow flowers, slightly tinged with green, are somewhat smaller than those of *H. flava*, but are large for the size of the plant, having the 3 inner perianth segments wavy. They appear in June and July, and each one lasts two or three days.

Culture &c. as above. A suitable plant for the rock garden, margins of shrubberies, borders &c.

H. Thunbergi. — This is a beautiful Japanese plant, closely related to and probably only a variety of *H. flava.* It has trusses of soft yellow flowers in July, which look very handsome against the green of the foliage.

Culture &c. as above.

PHORMIUM (New Zealand Flax Lily).—A genus of large bold Iris-like plants having a short thickened rootstock with masses of thick fleshy roots, and long radical sword-shaped leaves, very tough and leathery in texture. Flowers in terminal panicles, having a tubular curved perianth with 6 segments, the 3 inner ones spreading at the tips. Stamens 6, protruding.

Culture and Propagation.—The Flax Lilies can be regarded as hardy only in the south and south-western parts of England and Ireland, and even in these localities the plants in some gardens will suffer in severe winters, while in others they escape uninjured after standing the ordeal of several degrees of frost. Planted in beds on the grass or in sheltered nooks, they have a very distinct and attractive appearance. Even in less favoured parts of the kingdom the plants may be grown in large pots or tubs in the greenhouse in winter, and placed out of doors at the end of May until autumn. The plants like a rich, well-manured, sandy, loamy soil, and may be increased by dividing the tufts in spring just before growth commences. They may also be increased by seeds sown under glass when obtainable. There are only 2 or at the most 3 species known, but there are many varieties, all worth growing, and all natives of New Zealand.

P. cookianum (*P. Colensoi; P. fosterianum*).—*Small Flax Lily.*—A handsome plant resembling *P. tenax*, but with much smaller and more pointed leaves 2–3 ft. long. The yellowish flowers, tinged with green on the outside, are borne on scapes 3–6 ft. high in summer, the inner tapering segments being reflexed. The variety *variegatum* has rather narrower deep green leaves with one or two stripes of creamy white near each margin.

Culture &c. as above.

P. tenax (*Common New Zealand Flax*).—A free-growing vigorous species with stiff erect dark green leaves 3–6 ft. or more in length, having reddish-brown edges, and always splitting at the tips when old. The yellow or reddish flowers, about 2 in. long, appear about August on scapes 10–12 ft. high.

There are several forms, such as *atropurpureum*, in which the leaves are of a beautiful purple suffused with red; *nigropictum*, a compact-growing variety with deep green leaves about 2 ft. long, narrowly edged with blackish-purple, especially near the base; *variegatum* is like the type, but has its deep green leaves striped with creamy white and yellow; *veitchianum* is also a form in which the narrower pea-green leaves are broadly striped with creamy-white from base to apex.

P. tenax is a very popular plant in Paris, where about 10,000 plants have been used for decorating the Hôtel de Ville.

Culture &c. as above.

FUNKIA (Plantain Lily).—A genus of ornamental herbaceous plants with a short thick woody rootstock and clusters of thickish roots. Leaves large, radical, stalked, oblong lance-shaped, ovate or cordate, with distinct parallel curved veins. Flowers showy, white or blue, more or less drooping on tall naked scapes, each one with a large bract at the base. Perianth funnel-shaped, with a short or long tube, widening at the throat, and having 6 lobes. Stamens 6, attached to the tube or beneath the oblong 3-celled ovary.

Culture and Propagation.—Plantain Lilies have striking ornamental foliage produced in thick masses carpeting the ground, and on this account are excellent for grouping at the foot of rockeries, the edges of borders and shrubberies, or near the margins of lakes, ponds &c.

They like a deep rich well-manured and well-drained sandy loamy soil to produce luxuriant masses of foliage. They are easily increased by dividing the crowns in autumn or spring, the latter season being the best. The plants should not be disturbed for about 3 years from the time of planting, and may receive a mulching of manure in the autumn or winter to keep the soil in a fertile condition.

F. Fortunei. — A beautiful Japanese species about 18 in. high, closely related to *F. sieboldiana*, with heart-shaped ovate pale green glaucous leaves having 10–12 curved veins on each side of the midrib. The pale lilac funnel-shaped flowers about 1½ in. long appear in July. There is a rare form in which the leaves are ornamented with a thin yellow midrib.

Culture &c. as above.

F. grandiflora (*F. japonica*). — A handsome species 12–18 in. high, with long-stalked ovate heart-shaped leaves 8–9 in. long, and trusses of pure white sweet-scented flowers from July to September, each one being about 4 in. long.

Culture &c. as above. Slugs are very fond of the young growths in spring, and a watchful eye should be kept on them.

F. lancifolia.—A distinct plant having tufts of green lance-shaped leaves 4–5 in. long, narrowed gradually towards each end. The white or lilac-tinted flowers, 1–1½ in. long, appear in August on slender scapes 8–9 in. high, scarcely overtopping the foliage. The variety *albo-marginata* is distinguished by the silvery-white edges of the leaves, and *undulata* by its irregularly frilled and wavy leaves; its variegated form has foliage heavily streaked and blotched with white. Native of Japan.

Culture &c. as above.

F. ovata (*Hemerocallis cærulea*).—A fine free-growing species with long-stalked ovate leaves 5–9 in. long, and racemes of bluish-lilac or white flowers, produced from May to July, on scapes 12–18 in. high, overtopping the foliage. The variety *marginata* has the leaves broadly edged with creamy white.

Culture &c. as above.

F. sieboldiana. — An elegant Plantain Lily with long-stalked broadly heart-shaped ovate leaves, 10–12 in. long and 7–8 in. broad, readily recognised by their beautiful glaucous tint. The white flowers 2–2½ in. long, more or less suffused with pale lilac, appear in summer on tall scapes in one-sided racemes well above the foliage, and give an additional charm to the plant. The variegated form, known as *cucullata variegata*, and another called *medio-picta* with a white midrib, are both charming plants, but somewhat less hardy than the type, and therefore require more sheltered spots or even pot culture in cold frames in winter. Native of Japan.

Culture &c. as above.

F. subcordata (*Hemerocallis alba; H. plantaginea*). — A fine Japanese species with heart-shaped ovate pale green leaves 6–9 in. long, 3–5 in. broad, borne on stalks 6–8 in. long. The pure white flowers, about 4 in. long, are borne in August on scapes 1½–2 ft. high.

Other names to be found in catalogues are *sinensis*, *spathulata*, *univittata*, and *viridis*, but the plants they represent are only forms of those described above.

Culture &c. as above.

KNIPHOFIA (TORCH LILY; FLAME FLOWER; RED-HOT POKER).—This genus, which is still better known in many gardens as *Tritoma*, consists of tufted herbaceous plants having a short rootstock with clusters of numerous thickish roots, and long narrow stiffish often grassy radical leaves. The showy scarlet and yellow flowers are borne in dense racemes or spikes on the top of tall naked scapes. Perianth tubular or cylindric with united segments free at the apex. Stamens 6, hypogynous, usually protruding. Fruit a round or ovoid leathery capsule with few seeds.

Culture and Propagation. — A rich sandy well-drained loam suits Kniphofias well, with abundance of water after growth has started in spring, and during the summer months. Most of the species are easily increased by dividing the roots, or detaching the suckers which are freely produced by many in early spring just as growth is about to begin. Seeds when obtainable may also be sown in gentle heat in early spring, or in cold frames or even the open border about April and May, and in this way new varieties or variations are likely to be obtained. For the first year the young plants are probably best grown in pots, and sheltered in a cold frame during the winter months. They may then be ready for transplanting in the open ground about the end of May.

During the winter it is not only wise but also beneficial to give the soil and the plants a good dressing of well-rotted manure or decayed leaves. This will guard the roots from frost, and the manurial matters will be washed down to the roots by the rain, thus fertilising the soil. As the cold winter rains, however, are injurious to the fleshy roots, it is essential that the soil should be well drained. The manure or leaves can be heaped up in such a way around the plants as to throw off a good deal of the wet.

Kniphofias are excellent plants for massing in groups on grass, near pieces of water, or in the flower border, and in warm sheltered nooks where they will have a free circulation of air. When in bloom they are strikingly handsome, their erect spikes of bloom shooting straight up like red-hot pokers from masses of deep-green graceful foliage and seen at a distance produce a grand effect; unfortunately they do not bloom until late in the summer and autumn, and in cold unfavoured districts their beauty is apt to be spoiled by the frosts. Many of the smaller species are merely of botanical interest, but are pretty enough in their own way.

Except where otherwise mentioned all the kinds described below are natives of S. Africa, being found in Cape Colony, Natal, Kaffraria, the Orange River Colony &c.

K. aloides (*Tritoma Uvaria*). — This is the handsomest and most vigorous of all the Flame Flowers. It grows 3–4 ft. high, and has masses of very long and narrow leaves, channelled above, keeled beneath, and toothed on the edges and keel. The brilliant spikes of flower appear in late summer, and last often until destroyed by frost. They are at first bright coral-red, fading to orange, and ultimately greenish-yellow. Many of the hybrid forms, which are now becoming popular, have been derived from this species. Among its own distinct forms may be mentioned *glaucescens*, with glaucous leaves and orange-red flowers; *grandiflora* (or *densa*), very large bright scarlet and yellow flowers, on tall spikes; *grandis maxima* and *nobilis* are very similar, the flower stems often reaching a height of 5–8 ft.; *longiscapa* has very long scapes; *maxima globosa* has rounded spikes of flowers; *præcox* is remarkable for producing its flowers in May, and its leaves are also broader than in the type; *Saundersi* has rich orange-scarlet flowers; and *serotina* begins to bloom later than all the others.

Culture &c. as above.

K. Burchelli. — A distinct species having bright green leaves 2–3 ft. long, gradually tapering towards the tip, and a purple or blackish spotted scape bearing a spike of scarlet and yellow flowers, the segments of which are tipped with green.

Culture &c. as above.

K. carnosa.—A handsome Abyssinian species, not very often met with in gardens, having rosettes of leaves from the centre of which spring scapes about 1 ft. high with cylindrical heads of rather small apricot-yellow blossoms in September. The protruding bright yellow anthers are very conspicuous, and add to the beauty of the blossoms.

Culture &c. as above.

K. caulescens.—A very thick-stemmed species having leaves of a beautiful glaucous bluish-grey tint, and flower stems 4–5 ft. high, ending in a dense head about 6 in. long of bright reddish-salmon flowers, in June and July, changing to greenish-yellow or white.

Culture and Propagation. — This species may be increased by separating the suckers from the base of the stem, if any are developed, and if planted in a cold frame in autumn in sandy soil they will be fit for the open ground the following May. In the absence of suckers, this species may also be increased by cutting off the head of the stem, which may be rooted in sandy soil. From the base of the stem offsets will spring in a short time, and as they get large enough may be detached and grown like the suckers referred to above.

K. comosa.—A pretty Abyssinian species 1–2 ft. high, with bright green erect linear leaves, almost triquetrous. The dense oblong heads of yellow flowers are produced in August, and are rendered remarkable on account of the long protruding stamens, which are about twice the length of the perianth tube. The variety *splendens* has orange-red or yellow flowers, and is very handsome.

Culture &c. as above for *K. aloides*.

K. corallina. — A beautiful hybrid probably between *K. Macowani* and *K. aloides*, the characters of both of which it inherits. It has a dwarf tufted habit, and produces brilliant scarlet flowers shading into orange-red.

Culture &c. as above for *K. aloides*.

K. foliosa (*K. quartiniana*).—A distinct species 1–3 ft. high, with tufts of sword-shaped tapering green leaves 3–4 in. broad at the sheathing base. The bright yellow flowers, sometimes tinged with red, appear in August in dense cylindrical racemes 6–12 in. long. Native of Abyssinia.

Culture &c. as above.

K. Leichtlini. — A handsome Abyssinian species with bright green triquetrous leaves about 4 ft. long, and spikes of vermilion-red and yellow flowers in August. The variety *distachya* is a strong-growing plant, with broader leaves than the type, and two or three heads of deep yellow flowers produced on the same stem. The anthers of the protruding stamens are crimson or blackish-purple and make a beautiful contrast with the colour of the perianth tube.

Culture &c. as above.

K. Macowani. — A small species 12–18 in. high with narrow awl-shaped green leaves 1–2 ft. long, deeply channelled in front, and strongly keeled behind. The bright orange-red flowers appear in August in cylindrical ovoid racemes 3–5 in. long, and have the perianth segments reflexed. *K. citrina* is closely related to this species, but has shorter pale lemon flowers. *K. primulina* is another yellow-flowered species about 4 ft. high, the tubular flowers being in a truss about 9 in. long at the end of the purple-spotted scape.

Culture &c. as above. A suitable plant for the rock garden in sunny well-drained spots. Grown in the ordinary border it is apt to die out. *K. primulina* is probably too tender for outdoor culture, except in the mildest parts. I have only seen it in blossom in pots about the middle of March, it having been protected in a cool greenhouse from frost.

K. Northiæ. — This is closely related to *K. caulescens*, but has broader leaves with serrulate edges. The pale yellow flowers are borne in dense heads about 1 ft. long, the upper ones being tinged with red at the tips of the segments.

Culture &c. as above. May be grown and increased in the same way as *K. caulescens*.

K. pumila (*Tritoma pumila*).—A very old garden plant with rough-edged glaucous leaves 12–18 in. long and about ½ in. wide. Flowers in August, bright orange-red, in dense racemes 3–5 in. long, at the top of a short scape over 1½ ft. long. *K. Tucki* is related to this species, but may be distinguished from it by its shorter and broader green leaves, by the perianth tube widening from the base to the throat, and by the less protruding stamens.

Culture &c. as above for *K. aloides*.

K. Rooperi (*Tritoma Rooperi*).—A fine species from Caffraria with sword-like tapering, deep green, not glaucous, leaves about 18 in. long and about 2 in. broad, strongly keeled behind, with serrulate edges. The orange-red flowers, about 1½ in. long, are borne in summer in dense ovoid-oblong racemes 6–8 in. long, on the top of a stout stem about 2 ft. high, and as they become old change to yellow.

Culture &c. as above. This species requires a warm sheltered position and a little protection in severe winters. It must not be confused with a late-flowering form of *K. aloides*, which is erroneously given the same name.

K. sarmentosa.—A species with creeping underground stems and glaucous leaves. It comes near *K. aloides*, having dense cylindrical heads of flowers 6–12 in. long, those on the upper portion of the spike being bright red in colour, while those on the lower portion are yellow, more or less suffused with red.

Culture &c. as above. This species is readily increased by the shoots from its underground stems, which may be detached almost at any time. A form called *hybrida* is the result of crossing *K. sarmentosa* and *K. aloides*, and is well worth growing.

K. triangularis.—This is a very desirable plant, and may possibly be a hybrid between *K. Macowani* and *K. aloides*, and may therefore be a form of *corallina*, which is reputed to have the same parentage. The flowers are like those of *K. Macowani*, but the leaves are longer and broader, and more in the way of *K. aloides*.

Others species of Kniphofia not so well known, but seen at Kew, and other botanic gardens probably, are *modesta*, white; *natalensis*, coral-red in long spikes; *pauciflora*, bright yellow, early-flowering, and dwarf in habit; *Nelsoni*, *pallidiflora*, white, from Central Madagascar, and too tender for most parts of the country; and *Kirki*, from Zanzibar, with reddish-orange flowers, likewise rather tender.

Culture &c. as above.

Hybrid Kniphofias.—Of late years the attention of hybridists has been turned to raising from seeds new forms of Kniphofias, and the yellow-flowered kinds have been used in conjunction with the scarlet ones—chiefly *K. aloides*. Many fine forms have resulted, and are as healthy and hardy as their parents. Among the best, mention may be made of *Atropos*, deep scarlet, early; *Else Hans*, orange and golden-yellow; *Francis Buchner*, orange and yellow; *V. Lemoine*, bright coral-red, changing to brilliant cinnabar-red; *H. Cannell*, orange-scarlet; *John Benary*, deep orange; *Obelisk*, citron-yellow; *Otto Mann*, nankeen-yellow; *Pfitzeri*, bright crimson, without a trace of orange or yellow; *Star of Baden-Baden*, beautiful bronzy-yellow, and several others.

YUCCA (ADAM'S NEEDLE; PALM LILY). A genus of distinct and stately perennials with a low or tall woody stem often branching and tree-like, and bearing at the top clusters of stiffish sharply pointed sword-like leaves, with margins entire or fraying into slender threads. The large drooping white or greenish-white flowers are borne in dense terminal clusters or panicles. The bell-shaped perianths consist of 6 distinct or slightly united lance-shaped ovate segments, and individually do not last very long. Stamens 6, hypogynous, with filaments becoming broader upwards. Ovary 3-celled with 3 sessile stigmas. Capsule 6-sided, fleshy, pulpy, or spongy, sometimes dry.

There can scarcely be two opinions as to the decorative character of Yuccas in the outdoor garden. Apart from their immense trusses of flowers, which cannot fail to call forth admiration, the plants are beautiful simply owing to the gracefulness of their foliage, the outer leaves usually recurving in an elegant manner, while the central tufts are more or less erect, all retaining a deep fresh green colour throughout the year. There is scarcely a place in the garden where Yuccas may not be used with advantage, either as single specimens on lawns, or in groups on grass, on the top of rockeries, terraces, banks, the sides of carriage drives &c.

Culture and Propagation. — Yuccas flourish in almost any ordinary well-drained garden soil, but do not like much lime. A rich loamy soil seems to suit them best, and they grow freely and luxuriantly in it. They may be increased by dividing the basal tufts in autumn or spring, or by means of the underground thick, fleshy 'eyes' or buds which some kinds produce freely on the rootstocks. The best time for taking the 'eyes' is in spring—about April and May, or at any time during the summer. A small portion of the rootstock should be left attached to each bud, which may be placed in pots or cold frames in rich, light soil. Slight waterings from time to time will stimulate growth and the formation of roots, and when they have become sufficiently vigorous the young plants may be planted in the open air, or grown in pots or tubs &c., according to the object in view.

In cases where buds are not freely produced on the rootstocks, a little artificial manipulation will cause them to form. Pieces of the rootstock may be cut lengthways or crossways, without, however, detaching the rind. They may be allowed to dry in the air for a few hours so as to form a film over the cut surface. Having been cut into short lengths, they may then be placed in light sandy soil in a hotbed or plunged in heat in a greenhouse, and well watered. Under the influence of heat and moisture the buds soon develop and form roots, and when large enough may be potted up and grown on under glass until well established. Seeds are very rarely produced, but when obtainable should be sown as soon as ripe in gentle heat. The seedlings are pricked out and grown on in the usual way under glass until large enough for the outdoor garden.

Although the kinds described below

flourish in the open air, many of them turn yellow and lose their leaves in a very short time if taken into a dwelling-room, especially if placed in dark corners and where gas is used. Such plants, however, soon recover if replanted out of doors.

Y. aloifolia. — A native of the West Indies, N. Carolina &c., having slender stems 15–20 ft. high, and tufts of green glaucous-tinted leaves 12–18 in. long, tipped with a reddish-brown spine, and having whitish serrulate edges. Flowers in May and June, white, about 2 in. deep, in dense rhomboid panicles 1–2 ft. long. There are numerous forms of this in cultivation, the best known being *Atkinsi* and *purpurea*, with purplish foliage; *arcuata*, *crenulata*, and *tenuifolia*, with narrow leaves; *conspicua* and *Draconis*, with broader recurved leaves; *quadricolor* and *tricolor*, leaves variously edged with green, red, and yellow; and *variegata*, striped with creamy-white.

Culture &c. as above. This species is hardy in the milder parts of the country, and will stand several degrees of frost without injury in some gardens, while in others a few degrees will affect it.

Y. angustifolia.—An almost stemless species about 3 ft. high, native of Missouri &c., and producing dense masses of stiff linear leaves 1½–2 ft. long, channelled above, sharply pointed, and frayed into numerous reddish-brown threads on the margins. Flowers in summer, greenish-white, 2–3 in. deep, in racemes about 1 ft. long, on the top of a simple erect scape 3–4 ft. long. A good rock plant. The variety *stricta* has broader and less rigid leaves, and a looser panicle of flowers. *Y. hanburyana* is allied to this species. It has linear rigid green leaves with brownish edges, and simple racemes about 1½ ft. long of white bell-shaped flowers.

Culture &c. as above.

Y. constricta (*Y. albo-spica*). — This species extends from Utah to N. Mexico, and has simple stems 3–5 ft. high, with dense clusters of stiff linear channelled leaves 1½–2 ft. long, strongly pointed, and having the reddish margins very much frayed into threads. The white flowers, about 2 in. deep, appear in summer in a deltoid panicle 3–4 ft. long, the ascending branches being 6–9 in. long.

Culture &c. as above.

Y. filamentosa (*Silk Grass*). — An attractive and almost stemless species from N. America with dense rosettes of firm sword-shaped leaves 1½–2 ft. long, and about 2 in. broad, having a somewhat glaucous tint, and the white edges frayed into thread-like filaments. The white flowers tinted with green outside are borne on scapes 5–8 ft. high in June, in dense rhomboid panicles with ascending flexuous branches. There are many varieties of this species, including golden-striped and silver-striped ones which are very attractive, but not so hardy as the green-leaved type. The plant known as *Y. flaccida* is only a variety of *filamentosa*, but is distinguished by having less rigid and more recurving leaves than the type, and downy panicles of white flowers with broader segments. *Y. glaucescens* is another variety distinguished by its glaucous leaves about 1 in. wide, and its flower stems densely covered with a bluish-grey down.

Culture &c. as above.

Y. glauca. — An ornamental North American species without stems, having tufts of sword-like leaves 1½ ft. long and about 1½ in. broad, glaucous when young, stiffly pointed, and edged with red-brown, the margins being entire or slightly frayed. The white broadly bell-shaped flowers appear in summer in dense pyramidal panicles 2–3 ft. long, well above the foliage.

Culture &c. as above.

Y. gloriosa (*Mound Lily*).—A native of the United States, having, when old, more or less branched stems 4–6 ft. or more high. The stiff erect slightly glaucous-green leaves, 1½–3 ft. long and 2–3 in. broad, are in dense rosettes, strongly pointed, and margined with reddish-brown, or serrulate in a young state. Its white or greenish-white bell-shaped flowers, tinged with red outside, are borne in summer in dense rhomboid panicles 4–6 ft. long, and give the plant a really glorious appearance.

There are many varieties of this, the best and hardiest being *recurvifolia*, which is also well known as *recurva* and *pendula*. The beautiful somewhat glaucous leaves are gracefully recurving, and make it a handsome plant for lawns, vases &c. When it gets old a stem is developed with huge tufts of leaves and immense trusses of flowers. It will not stand the atmosphere of a dwelling-room, but keeps green and healthy out of doors in winter time. There is a variegated form with a greenish-red stripe down the centre.

Culture &c. as above.

Y. rupicola (*Y. contorta*).—A stemless Yucca, native of Texas, with dense rosettes of sharp-pointed sword-like leaves 1½–2 ft. long, often twisted, smooth above, roughish beneath, and with pale and serrulate edges. The white flowers tinged with green on the outside appear during the summer and autumn months.

Culture &c. as above.

Y. treculeana.—This is a magnificent species from N. Mexico and Texas, and when full-grown has much-branched stems 20–25 ft. high and 1–2 ft. in diameter. The masses of sword-like leaves are 2–4½ ft. long, and over 3 in. broad, deeply channelled in front, strongly pointed, and having reddish-brown edges, which in a young state are slightly serrulated. As they increase in age they also gradually pass from a graceful recurving position to a stiffer and more erect one. The white bell-shaped flowers appear in summer in dense panicles 2–4 ft. long, with long narrow segments. *Y. canaliculata* is a variety having smaller flowers and deeply channelled leaves about 2 ft. long, and is altogether a smaller plant than the type, which is known in gardens under many names, such as *agavoides*, *concava*, *contorta*, *cornuta*, *revoluta*, and *undulata*.

Culture &c. as above. This species assumes fine proportions in the mildest parts of the kingdom.

CORDYLINE (Club Palm).—A genus of beautiful Yucca- or Palm-like plants with more or less woody stems, often stoloniferous at the base, sometimes tree-like, with sessile or long-stalked more or less leathery leaves. Flowers small, white, in branched panicles, rarely produced on young plants. Fruit a few-seeded berry.

C. australis.—A beautiful and graceful New Zealand plant with stems 10–40 ft. high when full-grown, and tufts of oblong lance-shaped gracefully arching or erect leaves 2–3 ft. long, with distinct parallel veins. When well developed dense masses of white sweet-scented flowers are produced.

Culture and Propagation.—A warm rich loamy soil suits this species very well. It may be increased by offsets, or seeds when obtainable and sown in gentle heat.

This is an excellent plant for lawns and gives a sub-tropical aspect to the garden. It is quite hardy and has been known to stand 20° of frost in the south of Scotland without injury, although the tops were killed after being subjected to about 25° for a few nights. In the spring, however, the shoots from the base sprang up strong and healthy, and being detached ultimately made fine plants.

C. Banksi and **C. indivisa** are suitable for the very mildest and warmest spots in the kingdom, but are not so hardy as *C. australis*. *C. indivisa* and its forms, especially *lineata*, *atropurpurea*, and *Veitchi*, are very handsome and flourish in the Scilly Islands and warm parts of Cornwall, and in the south of Ireland. In mild winters they would also probably succeed in other parts of the kingdom in sheltered spots, if given protection in frosty weather.

ASPHODELUS (Asphodel).—A genus of plants having small rhizomes, clusters of fleshy roots, and radical linear strap-shaped, somewhat 3-sided, or roundish hollow leaves. Flowers white or yellow, the perianth segments having a brownish line or nerve down the centre. Stamens 6, hypogynous, alternately long and short. Capsule leathery 3-sided few-seeded.

Culture and Propagation.—Asphodels flourish in deep sandy well-manured loam, and may be used in the decoration of borders and shrubberies. They are readily increased by dividing the roots in early spring, or by sowing seeds at the same period in gentle heat or cold frames. The latter is a slow process and hardly worth troubling about, as it takes some years to rear really good flowering plants.

A. albus.—A native of S. Europe about 2 ft. high, with smooth keeled linear leaves, and clusters of white flowers produced in May and June.

Culture &c. as above.

A. comosus.—A Himalayan perennial 1½–2 ft. high, related to *A. ramosus*, but differing in the long bracts which protrude beyond the flowers, and in the much-projected stamens. The glaucous sword-shaped leaves are about 18 in. long, and the white flowers with greenish keels to the segments are borne on tall branched stems in summer.

Culture &c. as above. This species should be grown in warm and sheltered spots.

A. creticus.—A pretty species about 2 ft. high, native of Crete. The branching stems are furnished with slender, striated, toothed and ciliated leaves, and the yellow flowers appear in July.

Culture &c. as above.

A. fistulosus, from S. Europe, grows about 18 in. high and has upright striated hollow awl-shaped leaves and white flowers in July and August.

Culture &c. as above.

A. ramosus.—A vigorous species 4–5 ft. high, native of S. Europe, with stiff sword-shaped leaves, channelled above, strongly keeled beneath. The large white flowers with a red-brown central line down each segment are borne in very long dense racemes during the summer months.

Culture &c. as above.

A. subalpinus (*A. Villarsi*).—A desirable plant 1–2 ft. high, native of Eastern France, with dense tufts of glaucous-green lance-shaped leaves, the outer ones gracefully recurving or sharply bent. The flower stems are about 3 ft. high, and appear in summer with dense spikes of white flowers, each one having an ovate pointed dark brown bract at the base.

Culture &c. as above.

ASPHODELINE (King's Spear).—A genus closely related to Asphodelus, from which it is distinguished by its erect simple leafy stems, and clusters of linear leaves, and sometimes with only 3 perfect stamens (instead of 6) in the yellow or white flowers, which are borne in long more or less dense racemes.

A. lutea (*Asphodelus luteus*). — This is the best known and most ornamental species. It is a native of S. Europe, and grows 3–4 ft. high, its erect stems being covered with deep green awl-shaped 3-sided furrowed leaves, with distinct paler veins. The beautiful sweet-scented yellow flowers are borne in summer in a long dense straight raceme, each blossom springing from the axils of a buff-coloured bract. The double-flowered variety (*flore pleno*) is a pretty plant, like the type in habit, but having double flowers.

Other species of Asphodeline met with occasionally are *A. liburnica*, having yellow flowers striped with green; *taurica*, white, striped with green; *brevicaulis*, yellow veined with green; *damascena*, white; and *tenuior*, yellow.

Culture and Propagation. — They flourish in ordinary garden soil and may be treated in the same way as the Asphodels. Increased by division of the roots in early spring.

PARADISEA (St. Bruno's Lily). A genus having only one species:—

P. Liliastrum (*Anthericum Liliastrum; Czackia Liliastrum*).—A graceful Alpine plant with a very short rootstock and clusters of white fleshy roots. It grows 1–2 ft. high, having tufts of radical linear leaves channelled on the upper surface. The beautiful white funnel-shaped flowers, about 2 in. long and as much across, are borne on tall stems in rather one-sided racemes in May and June. They emit a sweet fragrance, and each oblong spoon-shaped segment is tipped with delicate green and 3-nerved, while the 6 hypogynous stamens occupy the centre. The variety *major* is a much more vigorous plant, often reaching a height of about 6 ft., while the flowers are about 1 in. longer and broader than those of the type.

Culture and Propagation. — This species thrives in well-manured sandy loam and may be used for the flower border and rock garden in open situations. New plants may be obtained by dividing the roots in autumn or spring, allowing about 1 ft. between the replanted portions.

CHLOROGALUM (Soap Plant).—A genus of distinct Californian plants with narrow tunicated bulbs, radical strap-shaped leaves, and tall loosely branched scapes. Perianth segments narrow, free, or slightly united at the base, 3-nerved in the centre. Stamens 6, attached to the base of the segments. Capsule 3-sided.

C. pomeridianum (*Anthericum* and *Phalangium pomeridianum; Ornithogalum divaricatum*).—A distinct plant about 2 ft. high with flaccid glaucous leaves roughened on the edges and nerves. The white flowers with purplish veins appear in summer, and open only in the afternoon—hence the specific name.

Culture and Propagation.—The bulbs of this species are said to be sometimes used as a substitute for soap in California. The plants grow in ordinary garden soil and may be used in the flower border. They are increased by offsets from the bulbs in autumn.

EREMURUS.—A genus of noble and ornamental herbaceous plants having short rhizomes and clusters of slender or fleshy roots. The long linear leaves are all radical, and the white, reddish, or yellow bell-shaped or rotate flowers are borne on tall, sometimes very high, simple leafless scapes, each one being solitary in the axils of the often scarious bracts. The segments are free, or very slightly united at the base, 1–5-nerved. Stamens 6, hypogynous, often longer than the segments. Capsule membranous, with 1–4 seeds in each of the 3 cells.

There are now about 30 species of Eremurus known, but only a few of them have been tried in a cultivated state yet, and that within the last 20 years or so. They are among the finest and most stately plants for the choice herbaceous border, and once seen in full bloom they are not likely to be forgotten. They are mostly natives of Central and S. Asia, being found in the Himalayas, Persia, Turkestan, and parts of Siberia, and it is questionable whether they are perfectly hardy in all parts of the United Kingdom. The probability is that they are not, except in the southern parts of England and Ireland. In other parts of the country, therefore, it would be wise in severe winters to give them some protection with a little straw, leaves, or litter, and keep their roots free from cold wet drenching rains.

Culture and Propagation.—They flourish in warm sunny situations facing south and make splendid masses in deep rich sandy loam, well-drained and manured. About September or early in October is the best time for planting. The roots being very brittle, great care should be exercised in filling the soil in among them so as to cause as little injury as possible. The plants should not be crowded with other vegetation, but should have ample space to develop to their full vigour, and once planted are best left alone for a few years without being disturbed. The soil may receive annual dressings or mulchings of well-decayed cow or stable manure, and during the period of active growth, and the hot summer months, copious waterings will be beneficial. In the early spring the plants shoot up often through the frosty soil, and the young and tender tips are then apt to become injured. A little sprinkling of clean straw, or better still a handlight placed over the crowns at night, will give the necessary protection. Slugs are very partial to the young growths and require watching.

These plants ripen seeds well in hot favourable summers, and by this means may be increased. The seeds should be sown in pots or pans under glass as soon as thoroughly ripe, and the young seedlings pricked out into similar receptacles containing nice fine sandy loam and leaf mould. For the first year or two until the seedlings have attained a good size, they are best grown in cold frames during the winter months. After this they may be planted in the open border in the situations and soil above recommended. If carefully performed, there is no reason why the plants should not be increased by dividing the rootstocks, but as some kinds do not flower for two or three seasons after planting, it is of course not wise to disturb them too often if they are to flower at all well.

The following are the handsomest kinds grown:—

E. Aitchisoni.—A fine species, native of the hills of Afghanistan, where it flourishes at an altitude of about 12,000 ft. It has rosettes of broad leaves 2–3 ft. long, and produces dense spikes of pale red flowers in June and July on the top of stout stems 3–5 ft. high.

Culture &c. as above.

E. aurantiacus.—This fine species also comes from Afghanistan, where it is found growing in rough, stony soil at an elevation of 7000–9000 ft. It has narrow linear leaves about 1 ft. long and ½ in. broad, and produces its flower-spikes in April and May, 2–3 ft. high, the upper portion being densely covered with bright orange-yellow blossoms, the segments of which are turned back, thus showing to greater advantage the longer stamens.

Culture &c. as above. In cultivation it flowers well in either sandy peat or loam, and ripens seeds in favourable seasons.

E. bucharicus.—A little-known species from Bokhara with 3-sided glaucous leaves having retrorsely serrulate edges. The flower-stem is about 8 ft. high, and bears a long and rather loose raceme of white flowers, each about an inch across, the segments having a brownish-red line down the centre.

Culture &c. as above.

E. **Bungei.** — A beautiful Persian species with smooth green leaves about 1 ft. long and ½ in. broad, slightly ciliated on the edges. The stoutish flower-stems appear in June and July, and are 1–3 ft. high, the upper portion being covered with bright yellow flowers about 1 in. across; the reflexed segments are distinctly keeled with green behind.

Culture &c. as above.

E. **himalaicus.** — This is a charming species from the Himalayas, where it grows at an elevation of 7000–10,000 ft. It has smooth, strap-shaped, acute leaves about 1 ft. long, and produces its erect spikes of beautiful white flowers about 1¼ in. across in May and June on the upper portion of a stout stem, which sometimes attains a height of about 8 feet.

Culture &c. as above. This is one of the hardiest species grown, and notwithstanding its rather early flowering period, does not begin to grow so soon in spring as other species, and thus escapes injury from the frost.

E. **kaufmannianus.**—This is a recently introduced species from Turkestan, and is a fine addition to the yellow-flowered kinds, and has moreover the additional charm of being fragrant.

Culture &c. as above.

E. **Olgæ.** — A pretty and distinct species from Turkestan with narrow leaves 1–2 ft. long, and flower-spikes 2–4 ft. long, the upper half being densely covered with pinkish-white or pale lilac-purple sweet-scented flowers over 1 in. across, opening in May and June.

Culture &c. as above.

E. **robustus.**—A vigorous free-growing species, native of Turkestan, at an elevation of about 10,000 ft. In well-developed specimens the leaves often measure 8 ft. long and 3 in. broad, while the flower-stem reaches a height of 6–10 ft., the upper 3 or 4 feet being covered with cylindrical and slightly tapering spikes of pale pink or rosy flowers each about 2 in. across, and expanding in May and June. As this species has long roots, the soil should be particularly deep and rich. The variety *Elwesianus* is much stronger than the type, and bears immense spikes of pink flowers at the same season.

Culture &c. as above.

E. **spectabilis** (*E. caucasicus*). — A variable species from Siberia, the Caucasus &c., and long cultivated in gardens. It has linear strap-shaped glaucous green leaves slightly channelled above and obscurely keeled beneath. The flower-spikes, which are 2–4 ft. high, are studded with pale sulphur-yellow flowers tinged with orange, and having deep orange anthers.

Culture &c. as above.

E. **turkestanicus.**—A native of Turkestan with broadly linear tapering leaves and stout flower-stems 2–4 ft. high, covered on the upper portion with reddish-brown or maroon-coloured flowers, the segments of which are edged with white, while the stamens are conspicuously protruding.

Culture &c. as above.

ANTHERICUM.—A genus containing about 50 species of tufted herbaceous perennials having short rootstocks, more or less fleshy roots, and radical linear leaves. The slenderly stalked flowers are borne on tall, leafless, simple or branched scapes furnished with linear scarious bracts. The perianth, which is sometimes slightly twisted, has distinct rotate-spreading, almost equal, 3–5-nerved segments, and 6 stamens hypogynous or slightly adnate to the base of the segments. Capsule scarcely 3-lobed, few-seeded.

Culture and Propagation.—Only one or two species are of any garden value. They flourish in well-manured sandy loam and leaf soil, which should always be well drained, as the roots do not like stagnant moisture. Copious waterings may be given during active growth, but comparative dryness is required during the winter months. As the plants are individually somewhat loose and meagre-looking, they are more effective planted in large masses, and may be used in the flower border, and left undisturbed for four or five years. A top-dressing of manure, however, is required every year under these conditions to replenish the nutriment taken from the soil.

The plants are readily increased by dividing the tufts in autumn or early spring. Seeds may also be sown as soon as ripe, and grown under glass until the following spring, when the seedlings may be planted out 9–12 in. apart.

A. Hookeri (*Bulbinella* and *Chrysobactron Hookeri*). — A beautiful New Zealand plant 1–3 ft. high, with linear sheathing leaves 9–12 in. long, and bright yellow flowers about ½ in. across, freely produced in erect racemes in early summer. This species likes a rich deep moist soil. *C. Rossi*, probably not in cultivation, is a much finer plant and remarkable for having yellow unisexual flowers.

Culture &c. as above.

A. Liliago (*Phalangium* and *Watsonia Liliago*).—*St. Bernard's Lily.*—A very free-flowering species from S. Europe cultivated for more than 300 years. It has tufts of narrow channelled leaves 12–18 in. long, gracefully recurving, and erect loose spikes of pure white flowers 1–1½ in. across, borne well above the foliage from May to August. The variety *major* is a more robust form with larger flowers.

Culture &c. as above.

A. ramosum (*A. graminifolium*).—A quick-growing species from Southern Europe, with flat, linear, grass-like leaves and strong erect flower-stems about 2 ft. high, branched at the top, and bearing trusses of white starry flowers from June to August.

Culture &c. as above.

Closely related to the Anthericums is a well-known S. African plant *Chlorophytum elatum variegatum*, which has beautiful silvery-white and green striped foliage, but is too tender out of doors for any except the mildest parts of the kingdom.

Culture &c. as above.

PASITHEA.—A genus with only one species here described:—

P. cærulea.—A distinct Chilian perennial with distichously imbricating grass-like leaves and loose pyramidal clusters of blue starry flowers produced in summer, each blossom having 6 narrow segments, 6 stamens, and a 3-celled ovary.

Culture and Propagation.—This is not a well-known plant although it has been in cultivation at intervals for many years. It flourishes in well-drained sandy loam and leaf-soil, and may be increased by division in early autumn or spring, or by seeds sown when ripe in cold frames.

APHYLLANTHES.—A genus with only one species here described with the generic characters:—

A. monspeliensis.—A pretty rush-like perennial with a short somewhat branching rootstock, native of Southern France, and remarkable for the absence of leaves. The latter are replaced by very slender leaf-like scapes, with membranous sheaths at the base, and small heads of deep blue flowers on top in summer. The 6-cleft funnel-shaped perianth is about an inch across, and has 6 stamens adhering to the base of the clawed segments.

Culture and Propagation. — This rare and pretty plant likes a good sandy peat, in warm sunny parts of the rock garden, where its deep blue flowers are very attractive about June and July. In severe winters, especially in naturally cold parts of the kingdom, the plant should have protection with a little litter, fern, dry leaves &c., or a handlight may be placed over it.

New plants are obtained by dividing the roots in spring during mild weather. Seeds may also be sown in pots or pans as soon as ripe, in a cold frame or greenhouse. The seedlings are pricked out and grown on for planting out the following June, or they may be grown in pots the first year.

AGAPANTHUS (African Lily).—This genus contains ornamental plants with short rhizomes emitting thickish fleshy roots, and having radical, broadly linear or strap-shaped leaves. The blue or rarely white pedicellate flowers are borne in large umbels on the top of a stoutish naked scape. Perianth funnel-shaped with a short cylindrical tube, and 6 nearly equal erect or spreading lobes. Stamens 6, attached to the throat of the tube; capsule oblong, angled, containing many ovules, which, however, never or rarely ever become seeds in this country.

Culture and Propagation.—There is practically only one species of African Lily grown in gardens, all the others being more or less distinct varieties of it. In mild winters they are practically hardy south of the Thames in warm sheltered localities, but the plants are mostly sheltered in a cool greenhouse or an old shed during the winter months. This is easily done when they are grown in large pots or tubs, in which they flourish and flower profusely year after year without any trouble being taken with them beyond giving plenty of water during the late spring and summer months. Indeed, there are few plants which give such good results in return for such bad treatment. In the southern parts of England and Ireland the plants may be grown out of doors in strong, rich, well-drained soil. In the event of severe frosts a little covering with hay, straw, mats &c. is little trouble. In such localities the plants would look beautiful by the margins of ponds, lakes &c., either by means of their arching bright green leaves or trusses of bright blue flowers. The plants are easily increased by dividing the rootstocks in early spring or autumn. If seeds can be obtained they should be sown as soon as ripe, but five or six years will elapse before they produce flowering plants.

A. umbellatus.—A beautiful S. African plant with leathery, strap-shaped, bright green leaves 1½–2 ft. long, and erect stoutish scapes 2–3 ft. high, carrying umbels of numerous bright blue flowers during the summer and autumn months. The following are forms of the type:—*albidus*, rather small pure white flowers, requires rest in winter, as the leaves die down; *aureus*, a rarely seen form with yellow-striped leaves; *flore pleno*, a fine double-flowered form, rarely seen; *Leichtlini*, flowers deep hyacinth-blue; *maximus*, flowers bright blue in large umbels; there is also a white form of this quite as large; *minor*, a pretty variety, smaller in every way than the type; *mooreanus*, a distinct smallish form with short, narrow leaves and small deep blue flowers; and *variegatus*, with leaves almost entirely white, except for a few green bands; rarely seen.

Culture &c. as above.

MILLA.—This genus now consists of only one species; others that formerly were in it are now included under *Brodiæa*.

M. biflora.—A beautiful Mexican plant having rather small corms or 'bulbs' with more or less fleshy roots, and few radical, very narrow, linear, grassy, glaucous leaves. The pretty salver-shaped flowers, snowy white within, greenish outside, appear in August on a simple naked scape about 6 in. high, usually 2–4 in an umbel, rarely one. The blossoms continue to appear for a long time in succession, and remain open during the night. The 6 stamens protrude from the mouth of the perianth tube.

Culture and Propagation.—This species requires to be grown in warm sheltered spots where it can be continually under supervision, as it is likely to be crowded out or smothered with ranker growing plants. It flourishes in a well-drained, rich, sandy loam, and may be increased by offsets from the corms, or more slowly by seeds.

BREVOORTIA (Crimson Satin Flower; Californian Fire Cracker).—A genus with only one species:—

B. Ida-Maia (*B. coccinea; Brodiæa coccinea*).—A pretty Californian plant, having tunicated corms, narrow linear leaves, and an erect slender flower-stem 2–3 ft. high, bearing a loose umbel of 4–12 blooms in June and July. The perianth is bright red or scarlet, over 1 in. long, with an oblong tube, and short, ovate, yellowish-green, spreading segments, and only 3 fertile stamens inserted on the corona in the throat.

Culture and Propagation.—This species likes a rich light loam, and the corms may be planted in September, and left undisturbed for four or five years. To obtain a fine effect several corms should be planted within 3 or 4 inches or a little more of each other, and when the slender flower-stems appear they should be kept erect by means of slender twigs.

The plants are increased in autumn by means of offsets from the corms, and also by seeds which should be sown as soon as ripe, and produce flowering plants in about 3 or 4 years.

BRODIÆA (Californian Hyacinth). A genus closely related to *Brevoortia*, having plants with more or less tunicated corms (or rarely bulbs), narrow, radical leaves, and umbels of flowers on the top of a simple scape. Perianth funnel-bell-shaped, narrowed at the base, dilated above, with 6 more or less equal, erect or somewhat spreading lobes. Stamens 6, all perfect, or 3 alternate ones reduced to staminodes.

Culture and Propagation.—Brodiæas are easily grown in fairly rich and well-drained sandy loam in warm, sunny parts of the flower border or rock garden. They are very showy when in bloom, and the corms are best planted about September, or not later than October, several together, to obtain a fine display. They should not be moved for several years, but may receive a top-dressing of well-rotted manure every autumn. The plants are easily increased by means of the offsets from the corms, and also more slowly by seeds in the same way as *Brevoortia*.

The following are the species chiefly met with in cultivation. They are all natives of California except where otherwise stated.

B. Bridgesi (*Triteleia Bridgesi*).—A species closely related to *B. laxa*, but easily distinguished by its longer and broader perianth tube with a decided red tinge. It produces its blue flowers freely during the summer months, as many as 10–20 blossoms being in an umbel.

Culture &c. as above.

B. californica (*B. Austinæ*).—A very fine species from the Sacramento Valley. It comes very near *B. grandiflora* but has a longer scape 15–18 in. high, bearing a loose umbel of 10–25 flowers of a beautiful rose-purple, each spreading funnel-shaped blossom being 1½–2 in. long, and the same in width. Perfect stamens 3.

Culture &c. as above.

B. capitata (*Milla capitata*).—A beautiful species with narrow linear leaves and fragile flower-stalks 1–2 ft. high, bearing numerous bright lilac or deep violet blooms about April in a capitate umbel. The oblong perianth tube is ½–¾ in. long, having oblong segments almost the same length, and the 8 anthers of the inner row have an oblong wing on each side. The variety *alba* is similar in habit, but has white flowers.

Culture &c. as above.

B. congesta.—A very free-flowering species with roundish slender leaves channelled on the inner face. The deep violet flowers, 6–12 in an umbel, are borne in summer on flexuous scapes 3–5 ft. long, and last a long time. There are 8 fertile stamens alternating with 8 purple cleft staminodes in the throat of the tube. There is a rare white-flowered form, which is pretty.

Culture &c. as above.

B. Douglasi (*Milla* and *Triteleia grandiflora*).—This fine species seems to be intermediate between *B. Howelli* and *B. laxa*, and is a native of British Columbia eastwards to Missouri. It has linear leaves, and dense umbels of 6–20 beautiful bright blue flowers about 1 in. long on the top of a scape 1½–2 ft. high. Perfect stamens 6, three of which are seated on the throat of the tube, the other three reaching nearly half-way up the segments with a short winged filament.

Culture &c. as above.

B. gracilis (*Triteleia gracilis*). — A rare and pretty dwarf species with solitary slender leaves, and about a dozen bright yellow flowers, about ½ in. long, in an umbel on the top of a scape less than 6 in. high. The oblong segments, as long as the yellow tube, are keeled with brown, and the 6 perfect stamens reach half-way up.

Culture &c. as above.

B. grandiflora (*Hookera coronaria*). This is the original species upon which the genus Brodiæa was founded by Smith in 1808. It is spread throughout California, Oregon, and Washington territory, and has slender linear leaves and bright violet-blue flowers, 3–10 in an umbel, on top of a scape about 18 in. long. The perianth tube is over 1 in. long, with rather longer oblong spreading segments and 8 fertile stamens. *B. minor* comes near this species but has only 2–6 flowers in an umbel on scapes 8–6 in. high. The variety *Warei* has lilac-rose flowers about 8 in. long borne on a stem 2–2½ ft. high.

Culture &c. as above.

B. Hendersoni.—This very rare species is a native of Oregon and comes near *B. Bridgesi* and *B. laxa*. The flowers, however, are salmon-yellow striped with purple, and are ½–1 in. long, with bluish anthers to the stamens in the centre.

Culture &c. as above.

B. Howelli (*Triteleia Howelli*). — A native of Oregon and Washington territory closely related to *B. Douglasi*. It has, however, smaller flowers, which are of a beautiful porcelain-white, delicately streaked with blue. The variety *lilacina* is a far superior plant, having 20 or more funnel-shaped flowers in an umbel, each 1 in. across, and of a soft lavender-blue with white segments.

Culture &c. as above.

B. hyacinthina (*Hesperocordum hyacinthinum; H. Lewisi*). — A pretty species having 2–3 linear leaves ¼–½ in.

broad and 10–30 flowers in an umbel on top of a scape 1–2 ft. long. The slender purple perianth tube is about ½ in. long, while the ovate or oblong spreading segments are about 3 times the length. The variety *lactea* (better known in gardens as *Hesperocordum lacteum*) is more slender than the type, and has umbels of white flowers striped with green behind. The form known as *lilacina* has larger white flowers than *lactea*, suffused with lilac.

Culture &c. as above.

B. ixioides (*Ornithogalum ixioides; Calliprora lutea*). — *Pretty Face.*—A beautiful species having 2–3 narrow linear fleshy leaves, and scapes 1–2 ft. long with umbels of 10–20 bright yellow flowers 1–3 in. long, the oblong segments longer than the tube being keeled with green, while the short filaments are furnished with a broad wing on each side. The variety *erecta* is a fine form with large clear yellow flowers of great substance, lasting a long time in perfection.

Culture &c. as above.

B. laxa (*Milla* and *Triteleia laxa*). A very pretty and showy species with narrow linear leaves, and scapes 1–2 ft. long, surmounted by umbels containing 10–30 or more pale or dark violet flowers, about 1½ in. long, with segments shorter than the funnel-shaped tube. The variety *splendens* is an improvement on the type, having stouter scapes and larger heads of blossom of a soft pale blue or pinkish-purple.

Culture &c. as above.

B. Leichtlini (*Milla Leichtlini*). — A pretty species native of the Chilian Andes. It has narrow linear leaves, and in March produces its slightly scented pure white flowers with a greenish band down the centre of the segments. Only a few large blossoms are borne on each umbel.

Culture &c. as above.

B. multiflora (*B. parviflora*).—A pretty species with 6–20 pale blue rather small flowers in an umbel on long scapes. There are 3 perfect stamens and 3 lance-shaped entire staminodia.

Culture &c. as above.

B. Orcutti.—This distinct and recently introduced species has linear flattish leaves and stout scapes 1 ft. or more in length, each carrying umbels of 5–15 or more bright lilac flowers over 1 in. in diameter, with 3 fertile stamens and 3 staminodia reduced to small triangular scales.

Culture &c. as above.

B. peduncularis (*Milla* and *Triteleia peduncularis*).—This is related to *B. laxa*, but has finer long-stalked flowers of a beautiful porcelain-white varying to rosy-purple, each ¾–1 in. long, forming large loose umbels 1–2 ft. across. Perfect stamens 6. This is a very free and vigorous species and makes a fine show when grown in large masses.

Culture &c. as above.

B. Purdyi.—This is a new and very distinct dwarf species, having beautiful rosy-purple or lilac flowers, with spreading and recurved segments, each of which has a central line of violet.

Culture &c. as above.

B. rosea.—A pretty dwarf species with roundish leaves and scapes 3–6 in. long, carrying 5–8 rosy-red or pinkish-purple flowers, less than 1 in. long, in an umbel. Fertile stamens 3, with dilated filaments, staminodia 3, white, strap-shaped.

Culture &c. as above.

B. sellowiana.—A very distinct and handsome species about 6 in. high, native of Uruguay. It has narrow deeply channelled grass-like leaves tapering to a point, mostly very much recurving and usually with the convex side uppermost. The solitary sweet-scented flowers are about 1¾ in. across, of a uniform beautiful bright golden-yellow, with the exception of a more or less distinct green central keel on the outer surface of the ovate acute segments.

This charming species is new to cultivation and I have only seen it growing in a cool greenhouse in which it flowered profusely during the month of January. The flowers have a sweet fragrance, and open only in the middle of the day when the sun is shining. Mention is made of it here because it is likely to prove quite hardy out of doors, at least in the milder parts of the kingdom. It should be grown in large masses to produce an effect, as each scape only bears one flower. As a contrast to *B. uniflora* it would be attractive.

B. stellaris.—A fine but rather rare species having roundish leaves and 3–6 reddish-purple, varying to deep blue, flowers in an umbel, borne by scapes only

2–6 in. long. Fertile stamens 3. Staminodia white, longer than the stamens.

Culture &c. as above.

B. uniflora (*Milla* and *Triteleia uniflora*).—*Spring Star Flower.*—A beautiful bulbous plant from Buenos Ayres with linear leaves 6–12 in. long and less than 4 in. broad, glaucous-green, with a strong central keel behind. Its beautiful flowers about 2 in. across appear in April and May, and are borne singly on slender erect purple-brown scapes 4–6 in. high, instead of in umbels or heads as in other species. The perianth tube is brownish-purple, while the spreading starry segments are of a beautiful soft lilac-blue, each one being ¾–1 in. or more long. There is a charming white-flowered variety *alba*, and the two plants mixed together in large masses look exceedingly handsome. Grows freely, and should not be disturbed for 3 or 4 years. Increased by the offsets from the corms or 'bulbs.'

Culture &c. as above.

B. volubilis (also known as *Stropholirion californicum*) is remarkable for its twining scapes often 12 ft. long, bearing 15–30 rose-coloured flowers in an umbel, but is not quite so hardy as the other species, and is not very often seen.

Other species of Brodiæa not yet in cultivation, or very rare, are ***terrestris***, ***leptandra***, ***filifolia***, ***pulchella*** (which is almost exactly like *congesta*, but has 6 fertile stamens instead of 3), ***insularis***, ***Palmeri***, ***candida***, ***crocea***, ***Lemmonæ***, ***sessiliflora***, ***patagonica***, ***nivalis***, ***poeppigiana***, ***setacea***, ***hirtella***, ***subbiflora***, ***vittata***, ***brevipes***, ***bivalvis***, ***violacea***, ***philippiana***, ***lugens***, and ***scabra***.

Culture &c. as above.

BLOOMERIA.—A small genus closely related to Brodiæa, having fibrous coated corms, long linear few or solitary radical leaves, and simple scapes ending in an umbel of many flowers. Perianth nearly rotate with 6 distinct spreading segments. Stamens 6, hypogynous, or very slightly adhering to the base of the segments.

B. aurea (*Allium croceum; Nothoscordum aureum*), a handsome Californian species with dense umbels of bright yellow flowers, and *B. Clevelandi*, also with yellow, but smaller flowers, and some on long pedicels, and some on short, are the only species in this genus and are not often seen.

Culture and Propagation.—These species may be grown in the same way as the *Brodiæas*. They flourish in rich sandy loam and like warm sunny positions in the flower border or rockery. They are increased by separation of the offsets from the corms in early autumn and also by seeds if obtainable in the same way as *Brevoortia* and *Brodiæa* above.

NOTHOSCORDUM.—A genus of plants with tunicated bulbs, flat, linear, radical leaves, and flowers in umbels on simple scapes. The perianth consists of 6 segments united at the base or as far as the middle, and is then spreading or bell-shaped. Stamens 6, shorter than the segments to which they are attached at the base.

N. fragrans (*Allium fragrans*).—A strong-growing hardy N. American plant with linear lance-shaped leaves, and white fragrant flowers, borne in summer, 6–20 in an umbel, on scapes 1–2 ft. high, each segment being keeled outside with pale lilac.

Culture and Propagation.—There are a few other species of *Nothoscordum*, but they are scarcely worth growing. The above is the best, and may be associated with its relation *Bloomeria aurea*, and receive similar treatment with that and the Brodiæas.

ALLIUM.—To this genus belong the well-known Onion, Garlic, Chive, Shallot, and Leek, and the ornamental species described below partake more or less of their nature. They have tunicated bulbs, flat or round narrow radical leaves, and numerous flowers in heads or umbels on the top of a simple leafless scape, with 2 more or less spathelike bracts. The perianth consists of 6 segments, free or slightly united at the base, more or less equal, spreading or somewhat bell-shaped. Stamens 6, attached to the base of the segments. Although there are about 250 species distributed throughout various parts of the world, chiefly Europe, N. Africa, and Abyssinia, sub-tropical Asia, and N. America and Mexico, only the few described below are considered of any importance or value for the flower garden.

Culture and Propagation.—They are all easily grown in ordinary well-drained garden soil, and may be increased by offsets from the bulbs in autumn or early in spring, and planted 3–4 in. deep. Seeds may also be sown in light rich soil in cold frames or hotbeds in February and March, and the seedlings will be fit for transplanting either in the autumn or the following spring. A mulching of well-rotted manure and plenty of water in hot seasons will be of great benefit to the plants, and induce them to produce large heads of fine flowers, which are beautiful in a cut state, although the scapes often emit the inevitable Onion flavour or scent.

A. acuminatum. — A native of N.W. America, with very narrow leaves and deep rose flowers ½–1 in. across, in July and August, on scapes 6–12 in. high. The variety *murrayanum* has deeper rosy-purple flowers.
Culture &c. as above.

A. cæruleum (*A. azureum*).—A handsome Siberian species with 3-sided leaves 6–12 in. long, and dense round trusses of beautiful sky-blue flowers in summer, on scapes 1–2 ft. high. Each segment has a deeper dark central line.
Culture &c. as above.

A. flavum. — A native of S. Europe, with rounded leaves flattened at the base, and yellow bell-shaped somewhat drooping flowers on scapes about 1 ft. high.
Culture &c. as above.

A. macnabianum. — A distinct and handsome N. West American species, with channelled leaves about 1 ft. long, and deep magenta flowers.
Culture &c. as above.

A. Moly. — A beautiful old garden favourite, native of S. Europe, with broadly lance-shaped leaves, and masses of fine bright yellow star-shaped flowers produced in June and July, in compact umbels on scapes 12–18 in. high.
Culture &c. as above.

A. narcissiflorum (*A. pedemontanum*). A fine Italian species, with lance-shaped leaves and graceful drooping clusters of large bell-shaped rosy-purple flowers, borne on shortish scapes in July.
Culture &c. as above.

A. neapolitanum. —This is a very popular species from S. Europe. Its strap-shaped leaves about 1 in. wide clasp the flower stems, which are 12–18 in. high, and bear loose umbels of white flowers with green stamens in early summer.
Culture &c. as above.

A. nigrum (*A. magicum*). — A free-flowering vigorous species native of S. Europe, having thick broadly lance-shaped leaves, toothed on the margins, and at first erect and somewhat glaucous, but afterwards green and spreading. The large umbels of violet or whitish flowers veined with green are borne in summer on scapes 2–3 ft. high.
Culture &c. as above.

A. Schuberti.—An extraordinary species of recent introduction. It has pale lilac starry flowers in June and July, having red stamens with white anthers, radiating from the top of the scape 1½–2 ft. high, and remarkable for having the opened flowers on pedicels about half the length, 2–3 in., of those bearing the unopened ones. It is hardy in warm spots but may require a little covering in severe winters.

Other species of note are ***subhirsutum*** with pure white flowers, and ruby-red anthers; and ***ostrowskyanum***, lilac-purple, with a deeper colour line down the centre of the segments.
Culture &c. as above.

GALTONIA (Cape Hyacinth). — A genus containing 2 species of beautiful South African flowering plants with tunicated bulbs, long and rather broad radical leaves, and drooping bell-shaped flowers in racemes on tall, simple, leafless scapes. Stamens 6, attached to the throat or perianth tube.

Culture and Propagation.—Galtonias are very effective when planted in masses in the flower border where they will not be too crowded by other plants. They flourish in almost any well-drained garden soil, but are more luxuriant in deep rich sandy loam and leaf soil. The bulbs need not be disturbed for 3 or 4 years, but the soil is then best with a good top-dressing of manure every autumn or winter to serve as a food replenisher, and protector from heavy rains and severe frosts.

The plants are easily increased by detaching the offsets from the bulbs in September or October and replanting. Seeds may also be sown under glass in early spring, and the seedlings grown on with this protection for the first year. The following season the young plants may be transferred to the flower border and will produce flowers in about 2 or 3 years from the time of sowing the seeds.

Galtonias are also suitable for cultivation in pots for cool greenhouses and conservatories, in which they flower a little earlier than in the open air.

G. candicans (*Hyacinthus candicans*). A splendid bulbous plant having large round bulbs and strap-shaped lanceolate leaves about 2½ ft. long. In summer it produces stout erect glaucous scapes shooting up for 4 ft. or more from the centre of the foliage, and bearing at the top a raceme of 20 or more large sweet-scented pure white flowers drooping like white bells.

Culture &c. as above.

G. princeps is very similar, but scarcely so attractive. It has shorter and broader racemes of smaller greenish-white flowers with spreading segments. *G. clavata* is also similar in appearance, but is not so showy. It differs in having smaller greenish-white flowers with shorter segments, and lance-shaped filaments to the stamens.

Culture &c. as above.

MUSCARI (Grape Hyacinth). — A genus of distinct-looking, pretty plants with tunicated bulbs, radical linear fleshy leaves and dense terminal racemes of drooping or nodding flowers on simple leafless scapes, the uppermost flowers being sometimes sterile, long-stalked and feathery. Perianth urn-shaped globose or oblong, constricted at the throat, having 6 very short, tooth-like, erect or at length recurved or spreading lobes, slightly unequal. Stamens 6, in 2 rows, attached to the tube. Capsule short broad, membranous, 3-sided or almost 3-winged.

Although a vast number of forms have been described as species it is probable that there are not more than 20 that can be really so called. They are natives of Europe, N. Africa, and W. Asia.

Culture and Propagation. — Grape Hyacinths are very easily grown in almost any garden soil that is not too moist and is fairly sandy. They enjoy a deep sandy loam enriched with manure and leaf soil and thoroughly well drained. New plants are easily obtained by detaching the offsets from the old bulbs every third or fourth year and replanting them. To obtain the best effects it is necessary to plant the bulbs in bold masses or patches, as one or two specimens dotted about here and there look very poor and give one no idea of the beautiful sheets of colour that several plants close together will produce.

Seeds are ripened freely and may be sown thinly in autumn or in spring in cold frames, allowing the seedlings to grow on for the first year without disturbance. They may then be moved into fresh quarters, but flowering plants will not be secured for 3 or 4 seasons.

M. æstivale.—A native of Asia Minor &c. with long linear deeply channelled light green leaves. The oblong tubular flowers, with 6 rounded prominences round the contracted mouth, are borne on pale green scapes 6–8 in. high, mottled with purple at the base. The lower flowers are yellow with green ribs, the upper ones tinged with purple.

Culture &c. as above.

M. botryoides.—A charming European plant with stiffish linear channelled glaucous leaves, and dense roundish clusters of deep sky-blue flowers, produced in spring on scapes 6–12 in. high, each blossom having 6 small white toothed segments. There are a few forms of this species, but *album*, with white flowers, and *pallidum*, with pale blue ones, are best known.

Culture &c. as above.

M. comosum (*Hyacinthus comosus*). This species has linear strap-shaped leaves 12–18 in. long, and dusky spotted scapes 1 ft. or more high, with loose racemes in April of blue flowers, the upper ones of which are sterile. In the variety *monstrosum*, a plant well known as the 'Feather Hyacinth,' all the flowers are sterile, and of a soft bluish-violet, the perianth being changed into a mass of slender twisted and wavy filaments which have a curious and attractive appearance.

Culture &c. as above.

M. conicum.—A native of Trebizond, having flaccid leaves nearly 1 ft. long, and dense obconical racemes about 1 in. long, composed of fertile and sterile blooms of a bright and pale blue respectively. They appear in March and April on slender scapes about 6 in. high, and are sweetly scented.

Culture &c. as above.

M. Heldreichi.—A Grecian species with flat linear leaves and scapes about 8 in. high with racemes of blue flowers like *botryoides*, only about twice as large, and appearing somewhat later in spring.

Culture &c. as above.

M. maweanum.—An Armenian species with spreading linear leaves 6–8 in. long and ⅓ in. wide, slightly glaucous and channelled. The flowers are bright light blue, borne in dense racemes on stalks 3–4 in. high; the segments of the oblong perianth are roundish, and white in colour.

Culture &c. as above.

M. moschatum (*Musk Hyacinth*).—A pretty little species from Asia Minor, having linear channelled leaves, and small but very sweet-scented flowers, changing from purple at first to a greenish-yellow tinged with violet. They appear in spring in dense roundish clusters over 2 in. long, on scapes about 9 in. high. The variety *flavum* (*M. macrocarpum*) has larger and looser clusters of yellowish flowers with purple teeth.

Culture &c. as above.

M. neglectum.—A native of S. Europe with linear deeply channelled fleshy leaves and deep blue sweet-scented flowers, 30–40 in a dense raceme about 2 in. long on a scape 6–9 in. high.

Culture &c. as above.

M. racemosum (*Hyacinthus racemosus*).—This pretty species is a native of England and is occasionally found in the sandy pastures of some of the eastern counties. It has small bulbs, half-round slender channelled leaves, 6–10 in. long, and short cylindric racemes of deep blue plum-scented flowers, the upper ones of which are sterile.

Culture &c. as above.

M. szovitsianum. — A rather large-bulbed species from the Caucasus, Persia, &c., with flaccid half-round slender leaves 5–6 in. long, and dense racemes in March and April of faintly scented bright blue fertile and pale blue sterile flowers.

Culture &c. as above.

HYACINTHUS (Hyacinth).—A genus of well-known beautiful plants having roundish tunicated bulbs, linear or strap-shaped radical leaves, and erect, spreading or drooping flowers in loose or dense racemes at the top of a leafless scape. The funnel- or bell-shaped perianth has 6 erect, spreading, or recurved lobes, and 6 stamens. Capsule roundish, 3 ribbed or lobed, few-seeded.

There are about 30 species of Hyacinth all of which, except 3 from south and tropical Africa, are natives of the Mediterranean region and the East. Only a few natural species, however, are cultivated, but the genus is not so remarkable for these as for the many fine and beautiful garden forms of *H. orientalis*, which are now grown literally in hundreds of thousands in Holland, where the light sandy nature of the soil and the climate are particularly suitable for their full development and ripening. The bulbs are imported in large quantities into this country every autumn, as better results are undoubtedly obtained from them than from bulbs that have been ripened at home. The latter, however, if stored in cool dry airy sheds in single layers on perforated shelves will keep in good condition and give a very fair display of flower in spring, so that they are not to be altogether despised. Bulbs, however, that have been strongly forced into early flower in great heat are practically useless for this purpose, and time and temper will be saved by throwing them away in favour of fresh ones.

Open-air Cultivation. — Hyacinth bulbs for the outdoor garden are generally smaller and cheaper than those grown under glass, and are known as 'Bedding Hyacinths' by nurserymen. They flourish in almost any good garden soil so long as it is well drained and free from stagnant moisture. A light soil well dug and manured some weeks before planting will give the best results, but the bulbs should never come directly in contact with manure. A handful of sand placed under each bulb is a very common practice, and is chiefly valuable for draining water away from the base of the bulb.

From the end of September to November is the best time for planting the bulbs, although good results are obtainable even when they have been planted in December in mild seasons. The time of planting only slightly influences the period of flowering in spring, perhaps more with some varieties than others, and there is certainly nothing gained by keeping the bulbs out of the soil when they have begun to sprout. The bulbs should be 6–8 in. apart, and 4–6 in. below the surface of the soil. In the event of severe weather a layer of litter, leaves, or well-rotted manure may be placed over the beds, or where this is considered too unsightly, a layer of coco-nut fibre will make a good substitute and have a neat appearance. By planting the bulbs thus deep they are not so much influenced by changes in temperature, too many offsets are not produced, and finer trusses of blossom are obtained. The latter last for several weeks, and only where the scapes are particularly heavy and likely to be injured by wind should they be supported by means of a stiff but slender stake.

Hyacinths are more effective if kept massed according to colour and variety instead of being mixed up in a higgledy piggledy way, weak and strong, short and tall, in a confused mass.

About the end of June when the leaves are turning yellow, or better still in July when they have withered, the bulbs may be taken up carefully. All the offsets may be removed and stored in dry sand or soil till the autumn, when they may be replanted in beds by themselves, and in two or three years will have reached the flowering stage. Previous to taking the bulbs up, they will be considerably strengthened, or rather they will not be so much exhausted, if the flower-stems are cut off as soon as possible after the flowers have begun to wither. Where it is desirable to save seeds, the flowers must of course be allowed to remain, but as it takes 4–6 years to obtain flowering bulbs from seeds, this method of increase is only likely to be adopted by the Dutch growers who are anxious to obtain new varieties. Besides the offsets from the sides of the bulbs, others may be induced to develop from the full-grown bulbs, by making one or two cross cuts in them about half way up from the base. When planted these cut bulbs do not leaf and flower very well, as most of the growing force is used up in forming young bulbs in the soil from the cut surfaces. These are detached in the same way as the other offsets in due course, and receive similar treatment.

Although Hyacinth bulbs are usually taken up every year, still it is not essential to do so. Where they will not be injured by subsequent cultivation, they may be left in the soil for 3 or 4 years without being disturbed, in which case they should receive a good top dressing of manure every winter.

It is very easy to be deceived in buying Hyacinth bulbs. Many that look and feel pretty firm and healthy are more or less touched with disease in the centre—the vital spot from which the flower spike is to come. Strong healthy bulbs should have a good broad 'plate' at the base, and as a rule those having a broad flattish top, and feeling heavy in the hand, are most likely to give the best flowers. According to variety, some bulbs are naturally large and some small, so that size is not of so much importance as firmness, weight, and the point referred to above. A good Hyacinth should have leaves in proportion to the vigour and size of the flower stems, from which they should stand out obliquely erect. The flower stem should be round, strong, and straight, quite free from the foliage, and should have the lowest flowers of the truss borne just above the top of the leaves. The truss should be round and cylindrical in shape, or slightly tapering from the base upwards, and well and regularly furnished with as many flowers as possible, each one standing out horizontally from the stem, giving each other mutual support, and allowing no intervening spaces.

For cutting purposes Hyacinths are very valuable and last a long time fresh in water. They are thus useful for decorations, and are universal favourites on account of their pleasing shades of colour, and the sweet and penetrating perfume which they emit.

Hyacinths in glasses.—This is such an easy, pleasant, and popular method of growing Hyacinths that it cannot very well be overlooked in this work. Ornamental glasses of various designs are used for the purpose. They are narrowed near the top in such a way that a rim is left for the bulb to rest upon, and not come in direct contact with the water. They are filled almost up to this rim with rain or ordinary water, into which a few pieces of charcoal may be put to keep it sweet. The bulbs may then be placed over the water on the rim, and should be kept in a cool dark place until roots are developed from the 'plate' at the base. If the temperature is too high, the bulbs will start into growth before roots are formed, and in a short time the new leaves will have exhausted all the stored up nourishment in the bulbs, and few or no flowers at all are likely to be produced. The first essential, therefore, in this treatment is to get the roots to form before growth on top begins. The plants may then be exposed to the light, and given a little fresh water occasionally. They will grow well in a window, and in due course produce fine trusses of flowers.

Where bulbs cannot be placed in a suitable place to form roots in glasses, they may be planted out of doors, and after the roots have formed may be lifted and washed, and then placed in the glasses.

A curious method of growing Hyacinths is as follows. A bulb is placed in a ball of damp moss and inserted in the lower end of an ornamental-leaved Beetroot which has been scooped out for the purpose. The Beetroot is then hung up head downwards, with the Hyacinth on top. Water is given from time to time, and as the Hyacinth sends its roots into the flesh of the Beetroot, and its leaves and flower-stems upwards, the Beetroot has developed its leaves, and a singular effect is thus produced between the two. A Turnip or Swede will do just as well as a Beetroot, but this bizarre style of gardening is perhaps scarcely worth cultivating.

Many other bulbous plants may be grown in water in the same way as Hyacinths, such as Crocuses, Crown Imperials, Chionodoxas, Scillas, Tulips, Jacobæa Lily, &c.

Hyacinths are easily grown in pots. They are planted in autumn one or more in a pot, and either plunged in soil or covered with ashes to a depth of 4 or 5 inches. When well rooted they may be taken into a warm greenhouse, and watered as required. They will thus be made to flower much earlier than out of doors.

'Roman' Hyacinths, which are forced in such large numbers every year, are really a French variety of *H. orientalis*, and are botanically known as the variety *albulus*. They are thus distinct from the species known as *H. romanus*, a native of S.E. Europe.

The following are some of the best single and double varieties of Hyacinths for the outdoor garden.

Single red, rose, pink Hyacinths &c.

Amy, fine bright carmine, good truss; *Belle Quirine*, deep rose; *Cavaignac*, salmon-rose, large bells and truss; *Charilaus* (or *Fireball*), very bright red, dwarf; *Charles Dickens*, splendid rose, grand spike; *Cosmos*, dark rose, large spike; *Fabiola*, pale pink, carmine striped; *Florence Nightingale*, large rose, striped; *General Pelissier*, rich deep scarlet, compact; *Gertrude*, rosy-pink, large compact truss; *Gigantea*, delicate pale rose, large close truss; *Jenny Lind*, bright red; *King of the Belgians*, splendid dark scarlet; *Lord Macaulay*, carmine, fine for exhibition; *Lord Wellington*, pale rose, large bells; *Madame Hodson*, deep rose, carmine striped; *Maria Catharina*, fine deep crimson; *Moreno*, waxy pink, large bells, very fine spike; *Norma*, delicate waxy pink, large bells; *Prince of Orange*, semi-double, light pink; *Queen of the Hyacinths*, brilliant crimson; *Robert Steiger*, fine deep crimson; *Romeo*, carmine-red, fine truss; *Sarah Bernhardt*, bright rose, large compact truss; *Sultane Favourite*, blush-rose, shaded pink, fine; *Victoria Alexandrina*, deep crimson; *Von Schiller*, deep rich pink, large spike; *Vuurbaak*, dark crimson.

Single white Hyacinths

Alba Maxima, *Alba Superbissima*, *Baroness van Thuyll*, *Belle Blanchisseuse*, *Blanchard*, *Crown Princess*, *Elfrida*, *Grand Vainqueur*, *Grande Vedette*, *Grandeur à Merveille*, *Lady Franklin*, *La Franchise*, *La Grandesse*, *La Pucelle d'Orléans*, *Leviathan*, *L'Innocence*, *Madame van der Hoop*, *Mammoth*, *Mina*, *Mont Blanc*, *Mr. Plimsoll*, *Paix de l'Europe*, *Princess Amalia*, *Queen Victoria*, *Rousseau*, *Semiramis*, *Snowball*, *Voltaire*.

Single blue Hyacinths

(*Those marked with an asterisk* (*)
are deep coloured varieties)

Argus, **Baron von Humboldt*, **Baron van Thuyll*, **Belle Africaine*, **Blackbird*, *Bleu aimable*, **Bleu Morant*, *Blondin*, *Captain Boyton*, *Charles Dickens*, *Cavaignac*, *Clio*, *Couronne de Celle*, *Czar Peter*, *David Livingstone*, **Emicus*, *Emilius*, **Ferruck Khan*, **Général Lauriston*, *Général Pélissier*, *George Peabody*, *Grande Védette*, *Grand Frédérick*, *Grand Lilas*, *Grand Maître*, *Grand Vainqueur*, **Keizer Ferdinand*, **King of the Blues*, **Lamplighter*, *La Peyrouse*, *Leonidas*, *Lord Beaconsfield*, *Lord Byron*, *Lord Derby*, **Lord Melville*, *Lord Palmerston*, **Marie*, **Masterpiece*, **Mimosa*, *Orondatus*, *Paulina Lucca*, *Pieneman*, *Porcelaine Sceptre*, *Potgieter*, *Priestly*, *Premier Gladstone*, *Prince of Wales*, **Prince Albert*, *Queen of the Blues*, *Regulus*, **Sir John Lawrence*, **Uncle Tom*, **William the First*, **William the Third*.

Single violet Hyacinths

Adeline Patti, Arnold Prinsen, Charles Dickens, Haydn, Jeschko, L'Amie du Cœur, L'Honn. d'Overveen, L'Unique, Mgr. van Vree, Pearl, Sir Edwin Landseer, Sir William Mansfield, Tollens.

Single yellow Hyacinths

Alida Jacoba, Anna Carolina, Bird of Paradise, Duc de Malakoff, Fleur d'Or, Herman, Héroïne, Ida, King of the Yellows, Koning van Holland, La Citronière, La grande Jaune, La Pluie d'Or, L'Or d'Australie, Obélisque, Optimist, Oranje Boven, Sonora, Victor Hugo, Yellow Hammer.

Double red Hyacinths

Alida Catharina, Baron van Pallandt, Bouquet Royal, Bouquet tendre. Czar Nicolas, Frederick the Great, Grootvorst, Koh-i-noor, La Belle Alliance, Le grand Concurrent, L'Espérance, Lieutenant Waghorn, Lord Wellington, Louis Napoleon, Marie Louise, Marie de Médicis, Noble par Mérite, Panorama, Perruque royale, Princess Alexandra, Princesse royale, Prince d'Orange, Regina Victoria, Rex Rubrorum, Sans Souci, Sir Joseph Paxton, Sir Walter Scott, Suzanna Maria.

Double white Hyacinths

Anna Maria, Blanchard, Bouquet Royal, Duc de Berry, Duchesse de Bedford, Flevo, Grand Monarque de France, Grand Vainqueur, Grootvorstin, Héroïne, Isabella, Jenny Lind, La Déesse, La Grandesse, La Tour d'Auvergne, La Virginité, Lord Anson, Madame de Stael, Miss Ketty, Miss Nightingale, Non plus ultra, Prince of Waterloo, Sceptre d'Or, Triumph Blandine, Venus, Violet Superbe, Virgo.

Double blue Hyacinths

A la mode, Albion, Belle Mode, Bloksberg, Bride of Lammermoor, Comte de St. Priest, Charles Crown Prince of Sweden, Charles Dickens, Duc de Normandie, Delicate, Envoyé, Garrick, General Antink, Globe terrestre, Grande Vedette, Graaf Floris, Keizer Alexander, King of the Nederlands, King of Wurtemberg, Laurens Koster, Lord Nelson, Lord Raglan, Lord Wellington, Louise Philippe, Mad. Marmout, Mignon de Dryfhout, Minister van Reenen, Murillo, Martines, Othello, Pasquin, Passetout, Paarlboot, Prins Albert, Prince Frederick, Prolifèra Monstrosa, Prince of Saxen Weimar, Rembrandt, Richard Steele, Robert Burns, Rudolphus, Shakespeare, Sir John Franklin, Sir Robert Peel, Tubalcain, Van Speyk, Von Siebold.

Double yellow and orange Hyacinths

Berry d'Or, Bouquet d'Orange, Crœsus, General Köhler, General Gordon, Gœthe, Heroine, Jaune Suprème, La Belle Souffre, La Grandeur, L'Or du Pérou, L'Or Végétal, Louise d'Or, Minerva, Ophir d'Or, Piet Hein, Sovereign, Sunflower, Van Speyk, William the Third.

H. amethystinus (*Spanish Hyacinth*). A pretty species from S.W. Europe, with narrow linear leaves. The scapes, 4–12 in. high, are produced in May and June, having loose spikes of bright blue, drooping or nodding flowers.

Culture and Propagation. — To see this species to the best advantage it should be grown in large masses of a hundred or more, and may be left undisturbed for 3 or 4 years. There is a white-flowered form named *albus.*

H. azureus. — This early-flowering species is a native of Asia Minor, and has white bulbs about 1 in. in diameter, from which numerous offsets are produced. The erect strap-shaped glaucous leaves, 4–6 in. long, are deeply channelled down the face. Early in February the beautiful sky-blue bell-shaped flowers are produced in dense conical heads with a thickened blue axis, the scape being shorter than the leaves, the whole somewhat resembling one of the Grape Hyacinths (Muscari). Owing to its early-flowering character, the flowers of this species are often injured by frosts, but if protected with a handlight they remain beautiful and fresh for a long time.

Other species are *ciliatus, fastigiatus, leucophæus, orientalis* (type), *romanus,* and *webbianus,* met with sometimes in botanic gardens.

Culture &c. as above.

PUSCHKINIA. — A small genus of plants with tunicated bulbs, few radical leaves, the first often oblong, the others linear, and blue flowers in loose racemes. or sometimes solitary on the simple leafless scape. Perianth tube short bell-shaped, with 6 nearly equal somewhat rotate spreading segments longer than the tube. Stamens 6, attached to the throat, the dilated filaments being united into a cup and produced beyond the anthers.

P. scilloides (*P. libanotica; P. sicula; Adamsia scilloides*).—*Striped Squill.*—A charming little bulbous plant, native of the Caucasus, Asia Minor &c., with dark green channelled lance-shaped leaves 4–6 in. long. The white or very pale blue flowers are borne on slender scapes 4–8 in. high about April; each flower is about 1 in. across, having the segments conspicuously and prettily striped with deep blue down the centre. The variety *compacta* is similar to the type, but its white flowers tinged and striped with blue are borne in denser and more compact trusses, and have a better effect.

Culture and Propagation.—The Striped Squill requires a warm sunny situation and a deep rich sandy loam and leafsoil, thoroughly well-drained, as coldness at the root caused by too much moisture is injurious to it. It is a charming plant for the rockery in places where it is not likely to be smothered by other plants. The bulbs should be planted about 4 in. deep in September or not later than October, and during hard winters are better protected with a layer of leaves, manure &c. which will also be useful to drain off heavy rains. The bulbs are best undisturbed for about 3 years, during which time they will have made good clumps, and may be divided and replanted after the foliage has completely died down.

CHIONODOXA (Glory of the Snow).—A genus of charming bulbous plants closely related to *Puschkinia*, which it resembles in having tunicated bulbs, few linear radical but sheathing leaves, and loose racemes of blue flowers, or solitary ones on a simple leafless scape. The deciduous perianth has a short bell-shaped tube and 6 longer, nearly equal, recurved spreading segments. The 6 stamens are attached to the throat, every other one or all the filaments being dilated into oblong petal-like bodies.

Chionodoxas are natives of the mountains of Crete and Asia, where they push their beautiful flowers in early spring through the melting snows, and have thus earned the appropriate popular name of 'Glory of the Snow,' which is practically a literal translation of the botanical name Chionodoxa, given by the French botanist Boissier, who discovered *C. Luciliæ* in 1842 at an elevation of about 7000 ft. flowering amidst the snow in Asia Minor.

Culture and Propagation.—Chionodoxas are perfectly hardy, and for naturalising in grass land with some of the smaller Narcissi, such as *minimus*, they are most valuable. For this purpose, however, they should be used by the hundred and thousand, and there are few finer sights than to see their beautiful blue flowers with a distinct white central zone peeping through the grass in March and April. Once planted, they need never be touched, or at least for several years, and will appear year after year with renewed vigour, while the foliage will have practically finished its work of storing up nourishment in the bulbs before mowing operations begin in earnest.

Chionodoxas may also be used to ornament the flower border and rockery, and will flourish in a compost of well-drained sandy loam, peat and leaf-soil. They may be increased by separating and replanting the offsets any time from July to October; and also by seeds, which are freely produced, and should be sown soon after they are gathered. It takes a few years, however, to obtain flowering bulbs from seeds.

C. cretica.—A pretty species from the mountains of Crete, having slender scapes 6–10 in. high, which unfortunately bear as a rule only one or two white or pale blue blossoms over ½ in. across. This species must be planted thickly to obtain a good effect. The variety *albiflora* has white flowers.

Culture &c. as above.

C. Luciliæ (*C. Forbesi*).—A beautiful and now well-known species, native of Asia Minor. It has small white pear-shaped bulbs with 2 or 3 erect or arching leaves to each flower-stalk, which is 6–10 in. high, and carries from 6 to 20 beautiful flowers about ¾ in. across, of a brilliant blue, shading to a zone of pure white in the centre.

There are several fine forms of *C. Luciliæ* now in cultivation, and they are all beautiful. That known as *gigantea* or *grandiflora* is particularly fine, having flowers similar to those of the type, but about twice as large. It is a free-flowering and vigorous variety and may be used for naturalising in grass, edges of borders, rockeries &c. The variety *sardensis* is often regarded as a species. It derives its name from the ancient town of Sardis, near which it grows at an elevation of 4000–5000 ft. It differs from *C. Luciliæ* chiefly in its Gentian-blue flowers, borne on nodding scapes, without a distinct white zone at the base of the segments. The variety called *Tmolusi* has flowers of a deeper blue, and with a larger white zone than in *Luciliæ*, and is valuable on account of its later flowering. The variety *alba* has flowers wholly white; and *Alleni* is a large - flowered form with blue, white, and pink flowers. A hybrid between this species (*C. Luciliæ*) and *Scilla bifolia* (p. 839) appeared some years ago in the garden of Mr. Allen of Shepton Mallet, and it received the name of *Chiono-Scilla.*

Culture &c. as above.

C. nana. — A pretty little Cretan species with linear leaves 2-4 in. long, and umbels of white or lilac-tinted blossoms about ½ in. across, produced in March and April on scapes not more than 3 or 4 in. high.

Culture &c. as above.

EUCOMIS. — A small genus of distinct S. African perennials having often large tunicated bulbs, oblong or elongated radical leaves, and stoutish erect scapes with dense racemes of flowers on the upper portion, surmounted by a tuft or rosette of empty leaf-like bracts. The perianth consists of 6 nearly equal spreading segments, very slightly united at the base. Stamens 6, attached near the base of the segments, and shorter than them. Ovary sessile, broad at the base, tapering into a columnar or conical style.

Culture and Propagation. — These plants, although not particularly showy, are, on account of their strong graceful foliage, and erect spikes of distinct greenish-yellow flowers, worth a place in warm sunny borders. They like a rich well-drained sandy loam, and should be planted in masses for effect. The bulbs need not be lifted for 3 or 4 years, but in cold wet or frosty winters should be protected with leaves, litter &c.

New plants are usually obtained by detaching the offsets from the older bulbs in autumn. Seeds may also be sown as soon as fully ripe in light rich soil under glass, and the young plants may be grown on in pots for the first year or two before trusting them to the open border. As they take four or five years to produce flowers, raising Eucomis from seeds is a slow process, and scarcely worth while.

E. bicolor. — A handsome vigorous species from Natal with round fleshy-rooted bulbs and oblong, unspotted deep green leaves somewhat wavy on the margins. The pale greenish - yellow flowers appear in August in dense oblong racemes, and are rendered conspicuous and even handsome by means of the distinct purple edge to the oblong segments.

Culture &c. as above.

E. nana.—This grows about 9 in. high, having broadly lance-shaped acute leaves and rather club-shaped scapes of brownish-green flowers. The variety *purpureo-caulis*, as the name indicates, has purple flower-stems.

Culture &c. as above.

E. punctata.—A fine species with large oblong lance-shaped channelled leaves, gracefully spreading and recurved, of a bright shining green, densely spotted with purple beneath. The creamy-white or yellowish, star - shaped, sweet - scented flowers appear from July to September in dense cylindrical trusses, on stout scapes 1½-2 ft. high, heavily spotted with purple, and having a tuft of red-edged bracts on top. The yellow - anthered stamens are opposite the segments, and the deep violet ovary in the centre of the flowers is very conspicuous and distinctly attractive. In the variety *striata*, the purple blotches on the leaves and flower stems partake more of the character of stripes.

Culture &c. as above.

E. undulata, with ovate oblong wavy green leaves, and greenish-yellow flowers; *E. regia*, with white very fragrant flowers, and *E. pallidiflora*, with leaves over 2 ft. long and 4–5 in. broad, and greenish-white flowers 1 in. across, are other species not so well known.

Culture &c. as above.

SCILLA (SQUILL; BLUEBELL). — A large genus of beautiful spring-flowering plants with tunicated bulbs, linear strap-shaped oblong or nearly ovate radical leaves, and flowers in simple leafless racemes. Perianth blue, rosy, or purplish, with 6 distinct or slightly united segments, spreading or rarely bell-shaped. Stamens 6, attached to the base or below the middle of the segments.

Culture and Propagation.—Hardy Scillas may be grown in much the same way as the Chionodoxas, and naturalised in grass, and as in the case of our beautiful Wild Hyacinth or Bluebell, planted under tall trees like Beeches, Oaks, Limes, Sweet Chestnuts &c. in pleasure grounds, woods &c., where they are wonderfully effective.

They may be planted in the autumn about September, either by inserting them in holes made with a dibber or by scattering them thickly over the ground and then covering them with 3–6 in. of soil. They may be left for years without being disturbed, and as some of the more vigorous kinds seed freely and produce numerous offsets from the old bulbs there is little fear of them dying out. The plants are, of course, increased by the offsets, but may also be raised from seeds, which should be sown as soon as ripe, but take several years to arrive at the mature bulb stage.

As edgings to flower borders or clumps in shrubberies Scillas look charming in spring, and wherever they can be associated with Chionodoxas, dwarf Narcissi, and other spring-flowering bulbs, space should be given them.

Out of 80 species or more the following are among the most attractive kinds for the hardy flower garden.

S. amœna (*Hyacinthus stellaris*).—*Star Hyacinth.*—A charming species from central Europe with roundish deep violet-coated bulbs, and bright green linear lance-shaped channelled leaves 6–9 in. long. From 3–6 star-shaped flowers are borne in loose one-sided racemes from March to May on weak stems 4-6 in. long. They are of a bright indigo-blue, each segment having a central line of a deeper tint.

Culture &c. as above.

This species requires rather warm and sheltered spots. When grown in large masses it has a fine effect, the blue flowers and bright green leaves forming a fine contrast.

S. bifolia.—A native of France and Central Europe with small roundish bulbs having 2 or rarely 3 linear lance-shaped channelled leaves of a soft-green, and 4–8 in. long. The beautiful blue bell-shaped flowers appear in March, sometimes even earlier, on solitary scapes 6–10 in. high, and nodding at the top.

Culture and Propagation.—This species although perfectly hardy should be grown in warm light soil, and in large masses, which need not be disturbed for 3 or 4 years. There are several distinct varieties of it, including *alba*, with pure white flowers; *præcox*, which flowers much earlier than the type and has larger and more numerous blossoms on a scape; *rosea*, with flowers of a pretty pale rose; and *taurica*, from Asia Minor, where it flowers on the snow-clad hills with *Chionodoxa Luciliæ*. It has larger bulbs than the typical *bifolia* and strong reddish scapes bearing 10–15 star-shaped flowers of a bright blue resembling those of *S. sibirica.* There is said to be a white form of the Taurian variety but it is very rarely seen, or may be confused with the white variety of *sibirica.*

S. festalis (*Agraphis nutans; Hyacinthus non-scriptus*).—*Bluebell; Wild* or *Wood Hyacinth.*—This is the Common British Bluebell seen in such immense masses in spring in woods, copses &c. in many parts of the British Islands. It has whitish more or less pear-shaped bulbs about 1 in. in diameter, and narrow channelled deep shining green leaves 9–18 in. long. The tall stout solitary scapes appear from April to June, bearing racemes of drooping bell-shaped blossoms varying from bluish-purple to white or pink. There are many fine garden forms, among which *alba*, white; *rosea*, rosy-red; and *rubra*, deep red, are fairly well known. The variety *bracteata* has rather long bracts at the base of the pedicels; and *cernua* from Central Europe has broader leaves than the type, and more numerous flowers of a bright blue colour on stouter stems. There are also white and rosy variations of it.

Culture and Propagation.—For British gardens the common Bluebell is superior to the other kinds for naturalising in grassland, woods &c. The bulbs should be planted in such places not by the hundred but the thousand, and may be left for years in the same place without disturbance. In the autumn or winter a covering of old leaves or well-decayed manure will be of great benefit, enriching the soil, and giving increased vigour to the flower stalks in spring. They seed and reproduce themselves year after year, deriving fresh nourishment from the decaying leaves in winter.

S. hispanica (*S. campanulata; S. patula; Agraphis patula; Hyacinthus patulus*).—*Spanish Bluebell.* — A fine species native of the Spanish peninsula, having linear strap-shaped bright green leaves ½–1 in. broad, and 6–12 bell-shaped blue flowers, borne on the upper portion of a slender scape 6–9 in. high. There is a good deal of variation in this species, and this doubtless accounts in a measure for the many names given it by botanists. The flowers vary from blue to white, rose, and purple, and among garden forms may be mentioned *alba*, white; *aperta*, blue striped with white; *alba compacta*, pure white bells in compact trusses; *carnea* (or *rosea*), pale rose; *Emperor*, porcelain-blue with deeper stripes; and *Empress*, similar but paler in colour.

Culture &c. as above for *S. festalis*.

S. hyacinthoides. — A pretty species from S.W. Europe, with lance-shaped linear leaves 12–18 in. long and ½–1 in. broad, tapering towards base and apex, and minutely ciliate-toothed on the margins. In April and May the scapes 1–2 ft. long appear, bearing from 50 to 100 bluish-lilac, rather bell-shaped flowers in long cylindrical racemes.

Culture and Propagation. — This species is not very well known and should be more extensively grown for its fine trusses of flowers. It requires warm light soils, and in bleak localities it would be wise to give it a covering of leaves or litter in hard winters.

S. italica (*Italian Bluebell*). — A brilliant Italian species with whitish obovoid bulbs, flaccid strap-shaped leaves, 4–8 in. long, keeled behind, and dense racemes, bearing 6–30 blue flowers in April and May on slender scapes 6–12 in. long. The variety *purpurea* is a strong form with deeper coloured flowers.

Culture &c. as above. This species should be grown in warm sandy well-drained soils.

S. monophylla (*S. pumila*).—A pretty species from the Spanish peninsula, usually having solitary leaves, as indicated by the name, 6–9 in. long. About April and May the slender flexuous scapes 3–6 in. high appear, bearing 6–20 blue or violet bell-shaped flowers in rather loose racemes.

Culture &c. as above.

S. peruviana (*S. hemisphærica; S. Clusi*).—A native of Central and S. Europe and N. Africa, and not of Peru, as would be imagined from the name. It has large whitish, pear-shaped bulbs and rosettes of leaves 6–12 in. long with white bristly margins. The numerous starry flowers of a beautiful blue are borne in May and June in dense broadly conical or deltoid clusters, which lengthen during the flowering period. There is a form with pure white flowers, called *alba*, and another with yellow blossoms, known as *lutea*.

Culture and Propagation.—This is a fine species for the open border in warm and sheltered situations in fairly dry and well-drained soil. It may be guarded against injury from frost by planting the bulbs 4–6 inches deep, and a covering of leaves or litter will afford still further protection if need be in severe winters. The plants are increased by offsets from the older bulbs after the withering of the foliage, but the plants should be left undisturbed for 3 or 4 years. Strong bulbs will throw up 1–3 flower spikes in succession, and where several such are grown together the effect when in flower is very fine.

Other species of Scilla met with occasionally are *Cupani* from Sicily, with dark purple-blue flowers; *ciliaris*, with heads of dark and light blue flowers varying to pearly white; *autumnalis*, a native species, with reddish-purple flowers; *pratensis* (or *amethystina*), with amethyst-blue flowers; there is also a white form of this, but rather rare.

S. puschkinioides. — A pretty bulbous plant somewhat resembling *S. bifolia*, and native of Turkestan. Each bulb has 2–4 bluntly linear leaves, and produces a raceme of erect starry pale blue flowers in early spring.

Culture &c. as above.

S. sibirica (*S. amœna sibirica; S. amœnula; S. uniflora*). — A charming Siberian species with round blackish-coated bulbs bearing 2–4 bright green oblong lance-shaped channelled leaves 4–6 in. long. From 1–6 horizontal or drooping starry bell-shaped flowers of a bright porcelain-blue appear early in February on fleshy scapes 3–6 in. high, before the others have developed. The variety *multiflora* has longer scapes and more numerous flowers than the type.

Culture and Propagation. — This species may be grown in pots, and lends itself readily to forcing in greenhouses if treated in the same way as recommended for Hyacinths. In the open air they like a rich sandy well-drained loam, and may be increased by separating the offsets any time from July to October, replanting them 2–3 inches beneath the surface of the soil. Bulbs that have been forced in greenhouses may be also planted in the flower border, and in a couple of years will regain their pristine vigour and increase freely.

Owing to its dwarfness and earliness this species is particularly valuable for the decoration of the rockery, edges of borders, or any other part of the garden where it may be associated with Snowdrops, Crocuses, Winter Aconites &c. There is a beautiful white variety named *alba*.

CAMASSIA (Quamash). — A small genus of North American plants with esculent tunicated bulbs, radical linear or strap-shaped leaves, and blue, purplish or whitish flowers in loose racemes on a simple leafless scape. The perianth consists of 6 nearly equal, distinct, spreading segments, finely veined. Stamens 6, attached near the base of the segments.

Culture and Propagation.— Camassias grown in masses are ornamental plants for the flower border, somewhat resembling the St. Bernard's Lily (*Anthericum Liliago*) in habit. The flowers are produced freely and are valuable for cutting. They grow well in ordinary good garden soil, but prefer a deep well-drained sandy loam and leaf-soil, in rather warm sunny spots facing south or south-west, and in partially shaded positions. They do not like wet heavy soil, especially in winter, when the bulbs are at rest.

They are increased by separation of the offsets from the full-grown bulbs any time from July to September. They may be either replanted immediately or stored in sand until about September, but should not be planted in this country later than October. In suitable positions the flower-spikes are generally strong enough to hold themselves erect without the aid of stakes, but in localities where strong winds are prevalent it is desirable to give the stems a support of some kind to prevent them being blown about.

C. Cusicki. — A native of the Blue Mountains of Oregon and California, having large rosettes of broad, glaucous leaves and flower-stems about 3–4 ft. high, bearing racemes of large, delicate blue flowers with spreading segments. There is another species from the Rocky Mountains called *C. Engelmanni*, which has bulbs very much larger than the other species mentioned. The leaves are 9–12 in. long, and about 1½ in. broad, and glaucous above, while the bright blue flowers are borne in a loose raceme.

This fine plant is not yet well known, but promises to be an excellent border plant. It has very large bulbs.

Culture &c. as above.

C. esculenta. — A native of British Columbia with white ovoid or roundish bulbs, the outer coats of which are of a smooth chestnut-brown. The leaves are linear, channelled, and somewhat flexuous, about 1 ft. long. The scapes, 1½–3 ft. high, appear from May to July, bearing 10–20 blue flowers about 2 in. across in loose racemes. The sixth segment is separated distinctly from the other five, and each one has about 5 distinct deeper blue nerves. There is a white-flowered variety, *flore albo*, and also one with deeper blue flowers than the type, known in gardens as *atrocærulea*; *atroviolacea* is similar, and *præcox* is an early-flowering form.

In its native country the inhabitants eat the bulbs of this species, which, it appears, are floury and of a good flavour when baked or roasted like Potatoes. The flower spikes will last a long time cut, and the buds will expand after the stems have been placed in water.

Culture &c. as above.

C. Fraseri.—A native of the eastern United States with sharp-pointed, narrow leaves, and flower-stems about 1½ ft. high, bearing 10–30 pale blue flowers, each about 1 in. across, in loose racemes in summer, often later than *C. esculenta.*

Culture &c. as above.

C. Leichtlini (*Chlorogalum Leichtlini*). This is a handsome species from British Columbia and California, and is a taller and more vigorous grower than *C. esculenta*, of which it is considered by some to be only a variety. The flower-stems often reach a height of 3–4 ft. in favourable situations, and produce during the summer months racemes about 9 in. long and 4 in. in diameter, of large, creamy-white flowers.

Culture &c. as above.

ORNITHOGALUM (Star of Bethlehem). — A large genus of plants with tunicated bulbs, linear or strap-shaped radical leaves and simple leafless scapes ending in elongated or somewhat corymbose racemes of more or less showy flowers. Perianth with 6 distinct segments, uniform in colour or striped and nerved with green behind. Stamens 6, usually hypogynous.

Culture and Propagation. — Out of about 70 species only a few are suitable for the flower garden, and some object to even these on account of their alliaceous, Garlic or 'Oniony' perfume. Grown in masses or naturalised in grass they are very attractive from a floral point of view, and the flowers of many of them last a long time when cut. Some kinds like the beautiful *O. arabicum* are rather tender except in the mildest parts of the country, and should be well protected with leaves, litter &c. in winter. They all flourish in ordinary well-drained garden soil, but the richer it is the more vigorous will the plants grow. New plants are obtained by separating the offsets from the older bulbs, as with Camassias, Scillas, and other closely allied groups.

O. arabicum.—A beautiful species from S. Europe and N. Africa with large whitish more or less pear-shaped bulbs and thick linear channelled leaves 12–18 in. long. The large creamy white flowers about 2 in. across, with bright yellow anthers, and a brilliant shining black ovary in the centre, appear in June and July in clusters at the end of a scape 1–2 ft. high. They emit a strong odour which is considered the reverse of agreeable by some folk.

Culture &c. as above. This species requires protection in winter with leaves, litter, moss &c. over the crowns. The bulbs may be grown in glasses in the same way as Hyacinths.

O. nutans. — A free-growing species from Southern Europe, but quite hardy enough to become naturalised in parts of the British Islands. It has narrow flaccid leaves 12–18 in. long, and loose racemes of drooping white flowers in April and May, the outer surface of the segments being veined with green, and the scapes 9–12 in. high. The variety *boucheanum* is more attractive than the type. It is dwarfer in growth, but has larger flowers.

Culture &c. as above.

O. pyramidale. — A native of S.W. Europe, with fairly large whitish Hyacinth-like bulbs and bright green lance-shaped leaves. The pure white flowers, striped with green behind, are borne in June and July, in pyramidal racemes 6–8 in. long at the end of a scape 1½–2 ft. high.

This pretty plant has its beauty somewhat marred by the fact that the leaves begin to wither and lose their fresh green appearance before the blossoms, which are quite 1 in. across, begin to expand. It possesses the recommendation, however, of thriving in shady spots and among thin shrubberies.

Culture &c. as above.

O. pyrenaicum, which has pale yellow-green flowers, striped with green outside, is not nearly so handsome, but it will also grow in shaded places, and may be used for this purpose like *O. pyramidale.* Now naturalised in parts of Britain.

Culture &c. as above.

O. umbellatum.—This is the Common Star of Bethlehem, native of S. Europe, and now also naturalised in parts of England in copses and meadows. It has linear channelled leaves 6–12 in. long, with a white stripe down the centre. In May and June the white flowers, striped with green behind, are borne in umbels or corymbs on a scape 6–9 in. high. The flowers open an hour or so before mid-day and close again in the afternoon about 3 or 4 o'clock. This is very hardy, and when once planted need not be disturbed for 3 or 4 years.

Other species of Ornithogalum, more or less suitable for the flower border, but not quite so handsome as those described, are *latifolium*, *narbonense*, and *sororium*, all with white flowers.

Culture &c. as above.

LILIUM (Lily).—A large genus of well-known and very beautiful flowering plants usually with scaly bulbs, and erect simple leafy stems sometimes branched at the apex, and bearing one or more large showy flowers either drooping, horizontal, or erect, in loose racemes. The funnel-

or broadly bell-shaped perianth consists of 6 distinct erect, spreading, or recurved segments, the 3 inner ones being usually larger and broader than the 3 outer ones. Stamens 6, hypogynous, with long slender filaments bearing oblong brown, deep red, or orange anthers. Fruit a 3-celled and 3-valved many-seeded capsule.

Culture and Propagation.—It is really astonishing that such fine flowering and ornamental plants as the Liliums are not more extensively grown in British gardens. With few exceptions, such as *neilgherrense* and *nepalense*, they are nearly all perfectly hardy in most parts of the British Islands. In cold bleak spots they may be protected and kept fairly dry during their winter sleep by covering the soil with straw, leaves, litter &c. Or the bulbs may be taken up after the foliage has withered, and stored in dry sand or soil until planting time in autumn or spring. It is, however, better on the whole not to disturb the bulbs for about 3 years, but to give them protection in winter, and a top dressing of well-rotted manure in spring as soon as growth has commenced.

Liliums are distributed throughout all parts of the north temperate hemisphere extending from California in the west to China and Japan in the east, across the continents of N. America, Europe, and Asia. They are therefore found naturally growing in different soils and under various climatic conditions, in all degrees of sunshine and shadow, drought and moisture. In the British flower garden they are as a rule best in positions where they will be shaded from the hot mid-day sun, as the flowers will last much longer than if exposed too much. They should not, however, be planted in deep shade under trees or among their roots, as the latter absorb too much food and moisture from the Lilies, while the overhanging boughs prevent the rain from reaching the bulbs in sufficient quantity. During vigorous growth Lilies like plenty of water, but the soil must at the same time be so well drained that it shall readily pass away from the bulbs.

As a rule the bulbs of strong-growing kinds, like *auratum*, *speciosum*, and *monadelphum*, should be planted from 6 to 10 inches deep according to the size of the bulb. By placing a piece of fibrous peat beneath each bulb and putting a good handful of sand over each at planting time, the roots will develop more quickly and take a hold of the soil, and the sand will prevent the wet clogging the soil around the bulbs.

Many of the most beautiful Lilies flourish in ordinary good garden soil, while others like a stiffish sandy loam enriched with well-rotted manure or leaf soil, and others again prefer a moist sandy peat. But whatever kind of soil they grow in, it should always be well drained, as stagnant moisture round the bulbs causes them to rot.

Some of the white bell-shaped and trumpet-flowered Lilies, like *candidum*, *longiflorum*, and its varieties, are forced in large quantities every year. If not subjected to too much heat, the bulbs thus treated may be planted out in the flower border and allowed to look after themselves, and in a couple of years will begin to flower freely unless, as in the case of *L. candidum*, they succumb to disease.

Lilies are readily increased by removing the offsets from the full-grown bulbs. It is a good plan to have a specially prepared bed for the offsets, in which they should be planted as soon as detached, and allowed to grow on for a couple of years. At the end of this time they will begin to flower freely and may then take their proper place in the flower garden at planting time. Indeed if two beds are kept for this particular purpose of receiving offsets, the latter may be taken every year from kinds requiring it, and the bed formed the preceding year need not be disturbed.

The fleshy scales (which are really modified leaves) of the bulbs may also be used to produce new plants, inserted endways into rich sandy soil and placed in a warm greenhouse. But this is rather a slow method of increase. Seeds may also be used, but unless it is wished to obtain new varieties or hybrids it is scarcely worth the trouble. Some kinds flower in 3–4 years from seeds, while others take nearly twice as long.

Other kinds, like *bulbiferum* and *tigrinum* for example, have the peculiarity of developing 'bulbils' or small bulb-like bodies in the axils of the leaves. These may be detached in autumn, and 'sown' or planted in the same way as the offsets in prepared beds by themselves. They develop into flowering bulbs in 2 or 3 years.

As the flower stems in Lilies are also the leaf bearers, it may be as well to mention that they should not be cut down (with the idea of not exhausting the bulb) until the leaves have withered. In the case of other bulbous plants where the flower stem is quite independent of the leaves, its removal after flowering strengthens the bulbs. In Lilies, however, the flowers themselves may be removed when faded, except when seeds are required.

Imported bulbs from Japan and California are often packed in sawdust or other fine material, and sometimes arrive in a more or less injured condition. Such bulbs should be overhauled immediately they come to hand, and all diseased portions removed. The bulbs may then be potted up or planted in their flowering position in the garden, as the case may be, or if they are to be kept over for a time on account of their shrivelled condition, should be stored in dry airy places packed in coco-nut fibre which is just sufficiently moist to restore the shrivelled scales to plumpness.

The following is a good list of the Lilies which may be grown and flowered out of doors in most parts of the British Islands.

L. Alexandræ (*L. Uke-uri*).—A magnificent Japanese Lily, supposed to be a natural hybrid between *L. longiflorum* or *japonicum* and *L. auratum*. It is a dwarf free grower, and when in fine condition produces in July and August as many as 4–6 flowers, 6–8 in. across when fully expanded, and of a pure white. It was described by Mr. Baker as a variety of *L. japonicum*, and a drawing of one of the first flowers to open in this country will be found in the 'Gardeners Chronicle' for August 26, 1893, p. 243. It flourishes in a deep sandy and stiffish loam and leaf soil, well tilled and drained.

Culture &c. as above.

L. auratum (*Golden Lily of Japan*).—This Japanese Lily is a great favourite in all parts of the kingdom. It has large bulbs and sends up leafy stems 2–6 ft. high bearing trusses of ivory-white broadly bell-shaped flowers often 9–12 in. across, each segment having a broad conspicuous band of bright yellow down the centre, and numerous deep purple blotches all over the inner surface, while the basal portion is studded with purplish stiff hairs or papillæ. The conspicuous anthers, which change from orange to purple and deep red brown, add to the contrast of colours. The flowers, which are sweetly scented, usually appear from June to August, and where the plants are thriving in particularly favourable spots it is not an uncommon sight to see from 70 to 100 large and perfect blooms borne on a single stem. The latter, however, loses its rounded shape, and becomes very much flattened or 'fasciated,' the better to bear its beautiful burden.

There are several forms of *L. auratum*, some rather poor and starry, but others magnificent. Among the most elegant may be mentioned *platyphyllum*, a grand sturdy-growing variety, with richly spotted flowers often exceeding a foot across. The white form of this called *virginale* is similar to *platyphyllum* in habit and size of flower, but the latter has only a deep golden band down the centre of the segments, which are faintly spotted with yellow, and throw into relief the deep ruby-red anthers; *rubro-vittatum* is a hardier plant than the type, with deeper green foliage, and white flowers banded with red down the centre of each petal; *Wittei* is a very scarce and fine variety with pure white unspotted flowers, striped with yellow down the centre, and occasionally having a tinge or streak of reddish-brown at the tips of the segments; *Parkmanni* is said to be a hybrid between *auratum* and *speciosum*. Its flowers resemble those of *rubro-vittatum*, having a red stripe down the centre, and being more or less spotted with crimson. *Tricolor* is a vigorous-growing variety with broad more or less erect leaves, and very large flowers without any purple-brown blotches or dots.

Culture and Propagation.—*L. auratum* and its varieties flourish in a compost of rich stiffish sandy loam and peat, in warm and sheltered situations. Some of the finest flowers I have ever seen produced were at Kew, among the Rhododendrons, in beds of moist peaty soil, where they were allowed to remain for two or three years without disturbance. In spring after the shoots appear above the ground a mulching of well-rotted manure may be given. The nourishment from this will be washed down to the roots by the rain and give the plants and flowers a wonderful vigour and substance. In many cottage gardens *L. auratum* flourishes and flowers freely planted in ordinary soil which may be top dressed with a little manure or scrapings from the road.

L. auratum may be increased by offsets as described above and also by seeds and bulbils which form in the axils of the lower leaves. The seeds, which should be sown in a cold frame or shallow pans as soon as ripe, germinate pretty freely, and should be allowed to grow on where sown for the first season, after which they may be treated like bulbils from the leaves and offsets from the bulbs. It will take several years to obtain flowering bulbs from seed.

L. Batemanniæ.—A glowing Japanese Lily, probably a hybrid between *L. Leichtlini* and *L. testaceum.* It grows 3–5 ft. high, having light green stems and narrow lance-shaped leaves. The unspotted flowers appear in the summer months, and are 4–5 inches across, of a glowing reddish-apricot tint, and resembling some forms of *L. elegans*, of which it is sometimes classed as a variety.

Culture &c. as above, p. 843. It flourishes in any good garden soil, and may be mulched with manure after growth has begun.

L. Bolanderi.—This is a recently introduced species from Oregon. It grows about 1½ ft. high, and produces deep crimson-red flowers with dark spots.

Culture &c. as above. It may be grown in sandy loam and peat, and although not much is yet known about it, will doubtless be hardy.

L. Browni. — A fine species closely related to *L. japonicum*, having stiff erect purple-spotted stems 2–4 ft. high, furnished with broadly lance-shaped leaves. From 1 to 3 beautiful drooping or horizontal bell-shaped flowers appear from June to August, and are 6–9 in. long, pure white inside, except for a line of purple down the centre of the 3 inner segments, and suffused with purple outside. The ruby-red anthers are a striking feature. A few years ago two forms named *chloraster* and *platyphyllum* were introduced from China. *Leucanthum* has no purple markings outside, but the less tubular white flowers are stained with yellow inside, and the leaves are also broader. *Viridulum* differs from the type in having broader and shorter leaves and creamy white flowers tinged with yellowish-green outside and having only a faint streak of purple-brown.

Culture and Propagation.—Although perfectly hardy this beautiful Lily is apt to die out when planted in the open border. The most suitable soil appears to be a mixture of sandy loam and peat, in which the bulbs should be planted 4–6 in. deep, in similar situations to *L. auratum.* It may be increased by offsets and bulbils which sometimes develop in the axils of the lower leaves. When the scales are used, the bulbs should be allowed to wither a little before they are wholly detached, as this induces them to root more freely, especially if the wound is allowed to heal before they are put in the soil.

L. bulbiferum.—A beautiful Lily from Central Europe having small ovoid bulbs, from which spring stiff erect downy furrowed stems 2–4 ft. high furnished with narrow lance-shaped leaves, in the axils of which shiny black bulbils are freely produced, a circumstance which suggested the specific name to Linnæus. The large erect crimson flowers shading off to orange-red spotted with brown appear in May and June, and are 2–3 in. deep, forming an umbel-like raceme at the top of the stem. Anthers deep red.

Culture and Propagation.—This is a fine species for the ordinary flower border. It flourishes in light soil in partial shade, but likes plenty of water when growing actively, and should always be in bold groups. It may be increased by offsets and also by bulbils. The latter do not all ripen simultaneously and those first gathered should be stored in sand or coco-nut fibre until all that are required for sowing are gathered. For general cultivation see above, p. 843.

L. callosum.—A rare Japanese Turk's Cap Lily, 2–3 ft. high, with very narrow sharp-pointed leaves, 4–5 in. long. The numerous drooping orange-scarlet flowers, about 1½ in. deep, appear in June and July in clustered racemes.

Culture &c. as above, p. 843. This species may be grown in rich sandy loam, peat and leaf soil in warm sheltered places. Increased by offsets.

L. canadense (*L. penduliflorum*).—A pretty Canadian Lily of the Turk's Cap section, having smallish rhizome-bearing bulbs and round erect stems 2–4 ft. high, furnished with whorls of oval lance-shaped leaves, slightly downy beneath. The scentless drooping funnel-shaped flowers with slightly reflexed segments appear in June and July. They are 2–3 in. deep, and vary in colour from bright orange-yellow to pale bright red, copiously spotted with purple-brown on the upper half of the segments. The variety with red flowers is known as *rubrum*, and that with yellow flowers as *flavum*. The variety *parvum* from California has shorter and more slender stems than the type, and leaves scattered or in whorls, while the flowers are about 1½ in. deep, and of a bright orange-red tinged with green outside, and heavily spotted with reddish-purple within.

L. lucidum, a native of Oregon and Washington, is closely related to *L. canadense* and is probably a variety of it. It has similar foliage, and bears 1–6 light translucent orange-yellow flowers spotted with dark purple, the perianth segments being lance-shaped and rolled back.

Culture and Propagation. — The Canadian Lily, which is often confused with *L. superbum*, flourishes in moist peaty and sandy loam, and may be grown among sheltering clumps of Azaleas, Rhododendrons, Kalmias, and other Ericaceous plants, in bold masses for effect. The bulbs may be planted 6–9 inches deep and the same distance apart according to size, and should not be disturbed for several years. An annual top-dressing of well-rotted manure, however, should be given by way of replenishing the soil, and inducing the plants to produce vigorous flower spikes.

This species may be increased by carefully separating and replanting the creeping rhizomes with bulbs attached. Offsets from the old bulbs may also be used, as well as single scales, but the plants should not be touched for purposes of increase until the stems and leaves have withered. The bulb scales should be allowed to shrivel a little and heal over the wound before planting in the soil in cold frames or in greenhouses. They soon emit roots but do not reach the flowering stage for four or five years.

L. candidum (*Madonna Lily*).—This is one of the finest and handsomest of Lilies. It is a native of S. Europe, Asia Minor &c., and produces stiff erect stems 3–5 ft. high, clothed with lance-shaped leaves, the first ones developed in late autumn being large and oblong and in rosettes on the ground, thus serving to drain off the cold winter rains from the bulbs beneath. The beautiful broadly funnel-shaped flowers 3–4 in. across appear in June 10–30 at the ends of the stems. They have a strong penetrating perfume and are of a pure shining white, with gracefully recurved segments and bright yellow anthers on the end of white filaments. By removing the anthers the purity of the petals is not tarnished by the falling pollen, and the flowers last for a longer time in a fresh condition. In a cut state they are used in vast numbers for decorations.

There are a few varieties of the Madonna Lily, but they cannot compare in beauty with the typical plant. The variety *monstrosum* has spikes of double flowers of a greenish-white; *peregrinum* is a smaller plant altogether, with smaller leaves and flowers; *spicatum* has white petal-like bracts; *striatum* has the outside of the segments striped with purple. There is also a form having the leaves striped with silver, and another in which they are striped with golden-yellow.

Culture and Propagation.—The finest plants I have seen have been grown in rather poor dry soil, and have not been disturbed for years. Every season they throw up stems quite 5 ft. high, each having from 20 to 30 beautiful flowers. They are planted outside a cottage door facing west, and do not obtain all the rain that falls, as they are protected by the overhanging eaves of the house. I have also seen plants doing well in ordinary garden soil in raised beds from which the rain readily passes away, and I think one of the chief causes of disease in the Madonna Lily is planting it in low badly drained soil containing too much moisture. Increased by offsets.

Wherever space can be found for it, a tuft of the Madonna Lily is well worth growing in any garden however small. It is easily cultivated, but flourishes best if not interfered with too often. Some of the finest flower spikes in the country are those produced in cottage gardens, often springing up from the edge of a dry gravelly pathway. When a great deal of trouble is taken with this Lily in regard to giving it rich soil and good situations it often proves a rank failure and succumbs to a disease which for some years past has now devastated plants in all parts of the country. The lower leaves are attacked with this disease in early spring, and unless measures be taken to check it immediately, all hope of obtaining flowers may be abandoned. A frequent fine syringing with warm or hot soapy water (say 100°-120° F.) will check the disease if not allowed to take too strong a hold upon the plants first. I have seen a plantation of 5000-10,000 Madonna Lilies so scourged with this disease that scarcely a hundred plants produced good flowers, and then only about 3-6 on a stem.

L. carniolicum. — A rare and pretty little species from the mountains of Carniola and Istria. It has small ovoid bulbs with narrow, pointed scales, and stems 2-3 ft. high, furnished with linear lance-shaped leaves, with minutely ciliated edges. The drooping flowers, 1½-2 in. deep, appear in June and July, and are of a bright orange-yellow varying to scarlet, and having the segments recurved as in *chalcedonicum*.

Culture &c. as above, p. 843. It flourishes in ordinary garden soil enriched with manure or leaf-mould, and may be increased by offsets.

L. Catesbæi.—An elegant Lily from N.W. America, producing glaucous, reddish-tinted stems 1-2 ft. high, with linear or oval lance-shaped pointed leaves. The erect bell-shaped flowers 3-4 in. long are of a bright orange-red heavily spotted with purple, the segments being slightly recurved at the tips, and suddenly narrowed into a claw at the base, thus leaving an open space between each.

Culture and Propagation. — This species is rather difficult to grow successfully, and although it comes from colder regions than many other hardy Lilies it does not seem happy in this country. A moist peaty soil with a little sandy loam seems to suit it best, but it is safer to grow it in well-drained pots, and winter it in cold well-ventilated frames. If grown in the open air it should be well covered with litter to keep the rain off, as moisture at that period is most injurious to the bulbs. Increased by offsets.

L. chalcedonicum.—A beautiful Turk's Cap Lily, native of S.E. Europe and Asia Minor, producing stems 2-3 ft. high, furnished with scattered linear leaves, which become gradually smaller and bract-like as they approach the drooping flowers. The latter, which are 2-4 in. deep and across, appear about July and August, 5-8 on the top of a stem, and are of a bright scarlet, having the segments gracefully rolled back towards the pedicels, thus exposing the red stamens and anthers. The variety *majus* has larger flowers than the type; *græcum* has smaller ones, but longer stems; *Heldreichi* flowers a week or two before the type, and *maculatum* is a pretty spotted form.

Culture &c. as above, p. 843. *L. chalcedonicum* and its varieties grow freely in ordinary good garden soil and may be readily increased by offsets. The fully grown bulbs should be planted about 6 in. deep and 9-12 in. apart. The flowers last well in a cut state and are very useful for decorations.

L. columbianum. — A graceful Lily from Oregon and British Columbia, growing 1½-2 ft. high and bearing umbels of drooping reddish-orange or yellow flowers with reflexed segments spotted with reddish-purple.

Culture &c. as above, p. 843. It reminds one of a small form of *L. Humboldti*, and may be grown in stiffish sandy loam and peat. It is not yet very well known in gardens, although introduced in 1872. Increased by offsets.

L. concolor (*L. sinicum*). — A distinct and pretty species, cultivated for many centuries in China and Japan. It has small ovoid pointed bulbs, often five or six in a cluster, from which arise stems 1-3 ft. high, clothed with scattered lance-shaped leaves 3-4 in. long. The erect bright scarlet flowers, about 2 in. long and wide, are borne 3-6 in a corymb in June and July, having a few brownish-purple spots near the base of the segments. The variety *buschianum* comes from S. Siberia and has bright scarlet flowers copiously spotted with black near the base; *Coridion* has bright yellow solitary flowers with reddish-brown spots; *Partheneion* is somewhat similar with bright orange-yellow solitary flowers, faintly spotted; and *pulchellum* from Mongolia is a dwarf slender-growing variety, with bright scarlet-crimson flowers spotted black. In a wild state the flowers are solitary upon the stems, but cultivated plants produce sometimes as many as six on a stem. The variety *luteum* has linear lance-shaped 3-nerved leaves and yellow flowers spotted with purple-red on the inner surface, the segments or petals being blunt and shallowly notched at the apex.

Culture &c. as above, p. 843. *L. concolor* and its varieties flourish in rich sandy loam and peat in partially shaded positions. They are easily increased by separating the young bulbs which are freely produced around the old ones.

L. cordifolium (*Hemerocallis cordata*). A distinct Japanese species with very large bulbs, and stems 3–4 ft. high, with a few long-stalked broadly heart-shaped ovate leaves, those first to appear being tinged with deep red. The erect or horizontal tubular flowers appear in July and August, 4–10 in a raceme, and are usually white in colour, with violet-brown spots at the base of the 3 lower segments.

Culture and Propagation.—This and the Himalayan *L. giganteum* differ very much in foliage from all other Lilies and form a group by themselves. *L. cordifolium* is, however, only about one-half or one-third the height of *L. giganteum*, and has much smaller flowers. It flourishes in moist sandy loam, peat and leaf-soil, and may be planted among Azaleas, Rhododendrons &c., so as to obtain a certain amount of shade and shelter. It is sometimes grown in pots, but is better in the open ground, and may be increased by offsets.

L. croceum (*Orange* or *Saffron Lily*). A beautiful Lily from the European Alps with round flattish bulbs tinged with rose and producing from the base bulb-bearing stolons—a fact which caused the French botanist De Candolle to give it the name of *bulbiferum*, but it is quite distinct from the plant which Linnæus called by that name (see p. 845). The stiff, furrowed, purple-spotted and somewhat cobwebby stems grow 3–6 ft. high, having scattered linear leaves, and umbel-like racemes of erect broadly funnel-shaped flowers 2–3 in. across, and of a beautiful golden-orange colour, sometimes slightly tinted with scarlet, and spotted with purple at the base. They are produced in June and July, and remain a long time fresh.

Culture and Propagation.—The Orange Lily is very strong and sturdy and flourishes in almost any garden soil either in sunshine or shade, and is useful for massing in shrubberies and borders. The bulbs should not be disturbed for 3 or 4 years, and the soil may receive liberal dressings of well-rotted cow-manure every year. It may be increased easily by offsets detached either in early autumn or spring. The full-grown bulbs should be planted 6–9 in. deep.

L. Dalhansoni.—A beautiful hybrid Lily between the *dalmaticum* variety of the European *L. Martagon* and the Japanese *Hansoni*, from both of which it also derives its name. It grows about 5 ft. high, bearing numerous flowers of a dark brownish-purple in June and July.

Culture &c. as above, p. 843. It is still very scarce in British gardens, but will grow in ordinary good garden soil and may be increased by offsets. Seeds if obtainable should also be sown where convenience and patience exist, as fine forms would probably be obtained thereby.

L. dauricum or **davuricum** (*L. pennsylvanicum; L. spectabile*).—A pretty Siberian species 2–3 ft. high, having slender stems and linear 3-nerved leaves. The erect beautiful orange-scarlet flowers flushed with red and spotted with black are borne in umbel-like racemes in July, each blossom having a more or less cobwebby stalk. The true species is often confused with *L. umbellatum* and its forms, which have probably arisen from it and *L. croceum*.

Culture &c. as above, p. 843. *L. davuricum* flourishes in ordinary good garden soil and may be massed in shrubberies, borders &c. in shaded or sunny places. Increased by offsets.

L. elegans (*L. aurantiacum; L. lancifolium* (Thunb.); *L. thunbergianum*). A fine showy Japanese Lily with small conical reddish or purple bulbs from which spring stout stems about 1 ft. high, furnished with lance-shaped leaves about 1 in. wide and bearing in June and July 1–3 erect cup-shaped scarlet-orange flowers 4–6 in. across when fully open, and slightly spotted with purple near the base.

There are many fine varieties of *L. elegans* now grown in gardens, and they are all beautiful. Among the best are *alutaceum*, a fine dwarf form about 6 in. high, with large bright apricot flowers spotted with black, and larger still in the form called *grandiflorum*; *armeniacum*, about 1 ft. high, with glowing orange-red flowers; *atrosanguineum*, with 5–6 large deep red and black-spotted blossoms on a stem; *Alice Wilson*, a rare and beautiful form with clear lemon-yellow flowers; *citrinum* is very similar; *aurantiacum* is an unspotted form of the type with large citron-yellow blossoms; *bicolor* grows about 18 in. high, each stem ending in a large orange-red flower flamed with yellow; *brevifolium*, about the same height, with light orange-red flowers produced earlier than those of other forms; *flore pleno* has deep red semi-double flowers; *Horsmanni* is an attractive variety with large well-shaped flowers of a rich crimson-mahogany colour; *fulgens* is a very variable form, like *atrosanguineum*, having deep blood-red flowers, more or less spotted with black; with this may be classed *sanguineum*, having similar flowers flushed with gold; *marmoratum aureum* (or *robustum*) is a tall early form with orange-yellow crimson-spotted flowers; *ornatum* similar, with black spots; *Prince of Orange*, apricot-yellow; *Van Houttei*, a fine crimson-flowered form; *Wilsoni* grows about 2 ft. high, bearing large erect cupped flowers, apricot-yellow spotted with purple, and having a yellow band down the centre of each segment; *venustum*, a distinct variety with downy stems, narrow leaves, and 1–10 bell-shaped flowers of a clear orange-yellow, borne rather later than the others in pyramidal trusses, and having orange-red stamens with purple anthers; the form known as *macranthum* is similar, but has larger blossoms; *Wallacei* grows about 2½ ft. high, and has rich orange-red flowers spotted with black. In fact there are now so many shades of colour being developed in this species, and each one receives a name, that it will be difficult to keep pace with them. *Beautiful Star*, *Beauty*, and *The Sultan* are among some of the later additions.

Culture and Propagation.—*L. elegans* and its varieties are remarkable for their dwarf habit, freedom and brilliancy of flowering, and perfect hardiness. They are excellent planted in masses in borders and shrubberies in a soil composed of sandy loam, peat and leaf-soil. On the fringes of thin Rhododendron and Azalea beds, and other Ericaceous plants, where there is plenty of sun and air, they flourish and look charming. They may be readily increased by offsets taken at the end of summer or early in autumn, and replanted immediately, or if more convenient in spring the bulbs and offsets should be stored in sand or dryish soil.

L. giganteum.—A magnificent Lily, native of the Himalayas, and like a glorified form of the Japanese *L. cordifolium*. It has large conical bulbs from which arise stout erect stems 6–10 and sometimes 14 ft. high, furnished with large heart-shaped oval leaves, having long stalks, and gradually becoming smaller and more shortly stalked as they approach the immense raceme, 1–2 ft. long, of large nodding trumpet- or funnel-shaped flowers. These appear in summer, 5–6 in. long, and are of a pale greenish-white outside, washed with violet-purple in the throat, and emit a sweet perfume.

Culture and Propagation.—*L. giganteum* flourishes in a deep thoroughly well-drained soil composed of rich sandy loam, peat and leaf mould. Warm sheltered positions facing south-east or south-west are preferable to others. Grown in thin Azalea or Rhododendron beds, or on lawns in the midst of dwarfer plants, a few plants of *L. giganteum* produce a very picturesque effect not only on account of the great height, but also by the distinct character of the bold foliage and immense trusses of fragrant flowers.

This fine Lily may be regarded as hardy and easily grown in most parts of the country. It is nevertheless prudent, especially in cold bleak parts of the kingdom, to protect it during the winter with a heap of straw, dry leaves, litter &c., or a handlight or inverted tub. This precaution will also ward off cold drenching rains, which are injurious during the winter when the bulbs are at rest. In the mild parts of the south of England and Ireland protection from frost is scarcely necessary, but too much moisture should be avoided.

The best time for planting the bulbs of *L. giganteum* is about April and May according to the weather. Unlike most other kinds the bulbs need not be completely buried in the soil. Only the base of the bulb and a few of the lower scales are placed in the soil, the remaining portion being left uncovered. In the event of spring frosts it will be wise to protect them with some dry leaves or litter until all danger is past.

L. giganteum may be increased by offsets, seeds, or division of the clumps, which somtimes increase quickly. The offsets are better detached from the bulbs in early spring than in autumn, and under favourable conditions will produce flowers the second or third year. When seeds are required it is safer to fertilise the flowers by hand than trust to insect agency. A bright sunny dry day should be chosen for the operation, and to make sure the pollen should be applied several times. The seeds should be sown in rich sandy soil in cold frames or under glass as soon as well ripened, and in four to six years will produce flowering bulbs, according to circumstances.

L. Grayi. — A graceful Lily, native of the Roan Mountains in N. Carolina, and closely related to *L. canadense*, of which it is probably only a geographical form. It grows 2–4 ft. high, and produces branched trusses of deep rich crimson drooping flowers, heavily blotched with purple at the yellowish base of the reflexed segments.

Culture &c. as above, p. 843. This species will flourish with the same treatment as *L. canadense.*

L. Hansoni. — A beautiful Japanese Lily with large white bulbs and stems 3–4 ft. high, furnished with whorls of 8–10 broadly lance-shaped, deep green leaves, and bearing at the summit 8–15 drooping flowers in a loose raceme or crowded umbel in June, often before those of the Madonna Lily. The flowers are of a bright orange-yellow, the lower portion of the reflexed segments being heavily spotted with blackish-purple or brown. One of the distinguishing features of this Lily consists in the shape of the buds, which are oval in shape and inflated at the apex, and are therefore little less long than broad.

Culture and Propagation.—This is a fine Lily for borders and shrubberies in rich well-drained sandy loam and peat, in situations where it will receive shade from the hot mid-day sun. Unfortunately it can only be increased slowly and with difficulty, as it does not produce offsets freely in cultivation, nor does it ripen seeds. It will therefore be a considerable time before this Lily is grown so extensively as it ought to be. In a cut state the flowers last remarkably well.

L. Henryi.—A distinct and remarkable Japanese Lily 3–6 ft. high, with deep green ovate lance-shaped recurved leaves, and sprays of nodding deep rich orange-red flowers, 3–4 in. across, in July and August and September. The wavy segments are gracefully curved backwards to the stalk, and spotted at the sides towards the base with deep purple-brown, while large and jagged papillæ or excrescences are very conspicuous on the surface.

Culture &c. as above, p. 843. This is a free-growing Lily and flourishes in ordinary good garden soil, with a little top-dressing of manure after growth has begun. Increased by offsets. Still rather scarce.

L. Humboldti (*L. bloomerianum*).—A very graceful and beautiful Californian Lily with large ovoid violet-tinted bulbs, which have the peculiarity of renewing themselves at the top while they disappear at the base, like the corms of Gladiolus and Crocus. The stout reddish or purple-spotted stems attain a height of 4–8 ft., bearing oval-lance-shaped leaves in regular whorls of 10–20 each. During the summer from 10 to 30 rich orange-yellow drooping flowers, heavily spotted with purple on the lower half of the reflexed segments, are borne in loose racemes, the stalk of each blossom standing out almost at right angles to the main stem. The variety *ocellatum* has yellow flowers, tipped with crimson or purple, and heavily blotched with purple at the base.

Culture &c. as above, p. 843. This flourishes in rich sandy loam, peat and leaf soil, and may be increased by offsets. The bulbs should be planted fairly deep, about 6–8 inches, as they seem to be affected by sharp and sudden changes of temperature.

L. japonicum (*L. odorum*).—A charming and unfortunately somewhat delicate Japanese Lily with small ovoid bulbs, producing glaucous-green stems 1–3 ft. high, often tinged with violet, and furnished with narrow lance-shaped leaves 4–6 in. long. About July and August from 2 to 5 broad funnel-shaped horizontal blooms appear on the stem. They are deliciously fragrant, of a pure ivory-white, sometimes tinged with purple outside, and when fully expanded are 6–9 in. or more across the mouth, while the pale brown anthers are very conspicuous.

Culture &c. as above, p. 843. The delicate constitution of this beautiful Lily renders it necessary to treat it with every consideration in the flower border. As a rule it will grow well under the same conditions as *L. auratum*, in a compost of stiffish sandy loam and peat, among Azaleas, Rhododendrons, Kalmias &c. The great point is to have the soil well drained and kept dry, and protected from frost in winter by a good layer of leaves, litter &c., and when planting always place plenty of clean sand around and beneath the bulbs.

L. Krameri (*L. japonicum roseum; L. Belladonna; L. Elisabethæ*). — A beautiful Japanese Lily closely related to *L. japonicum*, and from a mere botanical point of view probably only a variety of it. For flower-garden purposes, however, they are not likely to be confused with each other, any more than with *L. Browni*, which is also closely related to *L. japonicum*. Kramer's Lily is a taller and stronger-growing plant than *L. japonicum*, having purple-spotted stems 3–4 ft. high, narrower, more tapering, and much longer leaves, and larger, sweet-scented, beautiful pink flowers, with gracefully spreading segments more or less recurved at the tips.

Culture &c. as above, p. 843. *L. Krameri* may be grown in the same way as *L. japonicum*.

L. Leichtlini. — This beautiful and graceful Japanese Lily has rather small bulbs and stems 3–4 ft. high, which at first shoot from the soil obliquely, but eventually become erect and clothed with narrow lance-shaped leaves, 3–4 in. long, tapering to a sharp point. The beautiful citron-yellow flowers, heavily spotted with purple inside, and suffused with purple outside, appear 1–3 on a stem in July and August. They are drooping, like other Turk's Cap Lilies, and have the narrow lance-shaped segments rolled backwards to the stalk.

Culture and Propagation.—This species may be grown in rich sandy loam, peat and leaf soil, like *L. japonicum* and *L. auratum*, and owing to its peculiar method of sending the stems out obliquely from the bulbs at first, is better adapted for the open border than for pot culture. Indeed, if grown in pots the young shoots are apt to press too hard against the sides of the pot before appearing above the soil, and are thus likely to become injured. The underground portion of the stem is furnished with scattered scales or modified leaves, in the axils of which bulbils are developed, and from these new plants may be obtained. According to their vigour these bulbils may produce flowering plants a year or two after being detached from the parent.

Although not very well known, mention may here be made of a few forms of this species. *Majus* grows about 5 ft. high, and has yellow flowers spotted with blackish-purple; *Maximowiczi* has dark purple-brown stems, more or less cobwebby or cottony, with 3–4 flowers of a bright orange-scarlet colour; *platypetalum* has pale red flowers with broad segments; and *tigrinum* has orange-scarlet flowers heavily spotted with dark purple. *L. Batemanniæ* is near some of these forms, especially *Maximowiczi*.

L. longiflorum. — A very handsome Japanese Lily with medium-sized, yellowish-white bulbs and stems 1–3 ft. high, clothed with bright green, sharp-pointed, lance-shaped leaves. In June and July from one to three or four beautiful pure white sweetly scented flowers are borne on the top of the stems, spreading more or less horizontally, 5–7 in. long, and as much across when fully open, funnel-shaped, tapering gracefully towards the stalk.

There are several distinct varieties of this white Trumpet Lily, among which the following are the most distinct. *Formosanum*, from the island of Formosa, has flowers somewhat smaller than the type, flushed with rosy-brown down the central ribs; *Harrisi*, *eximium*, or *Wilsoni* are all apparently the same plant, or so close that they are scarcely distinguishable from one another. They have magnificent flowers of a pure glistening white, and are often 8–10 in. long, and 4–6 in. across the mouth. Under the name of *Harrisi* this variety has been cultivated for many years in the Bermudas, and has hence become well known as the 'Bermuda Lily.' Of late years, however, a devastating fungus disease has attacked the crops and interfered with the exportation of fine bulbs. The Japanese name of *Liu-kiu* represents forms of *longiflorum eximium*. The variety *Takesima*, known in Japan as *Jama-juri*, is a plant intermediate between *longiflorum* and *eximium*, with a tendency to produce more flowers and at a later period. This variety is distinguished chiefly by the buds being washed with brownish-purple or violet, but when expanded it is more difficult to identify them. A form of *Takesima* called *grandiflorum* is a vigorous grower, with stiff foliage and dark brown stems bearing from 6 to 10 white tubular flowers tinged with brown outside. The variety called *præcox* is dwarf in habit and produces its flowers earlier than the other forms, under the same treatment. Besides the above forms, there is a distinct one, *albo-marginatum*, the leaves of which are attractively edged with ivory-white.

Many thousands of *L. longiflorum* and its varieties are forced in heat during the winter and spring months, and an immense trade is carried on in the cut flowers for decorative purposes. They last a very long time in a cut state, and their purity, grace, and substance attract universal admiration.

Culture and Propagation.—For outdoor cultivation nearly all the *longiflorum* Lilies may be used for the embellishment of flower beds and borders, or may be mixed with other plants in groups on the grass. They like a light rich soil composed of sandy loam and leaf mould, and even a little well-rotted manure, and perfect drainage is essential. Frost should be guarded against by a protection of dry leaves, bracken, straw &c., as the young shoots are apt to get injured. Warm sheltered and sunny situations should be chosen when the bulbs are planted in autumn. Increase is effected by means of offsets, but cultivated bulbs have a tendency to become smaller and smaller, and do not produce such fine flowers as healthy imported ones.

L. Lowi.—A beautiful Burmese Lily 2–3 ft. high, bearing in July at the top of the stems 3–5 white bell-shaped drooping or nodding flowers more or less heavily spotted with violet or crimson-purple.

Culture &c. as above, p. 843. Very little can be said yet as to the hardiness of this Lily. It is believed to be hardy, but all the plants I have seen have been grown in pots under glass. In the mild parts of S.W. England and Ireland it would probably grow well out of doors.

L. maritimum. — A pretty little Californian Lily 3–5 ft. high, with alternate or whorled narrow oblong lance-shaped leaves chiefly clustered near the base of the stem, and bearing 15–20 deep red bell-shaped flowers spotted with dark purple.

Culture &c. as above, p. 843. This may be grown in sandy peat with a little loam, and may be treated like *L. canadense.*

L. Martagon (*Turk's Cap Lily*).—A well-known and much cultivated Lily from Central and S. Europe and Asia. It has small ovoid bright yellow bulbs 1–1½ in. in diameter, producing stems 2–3 ft. high, clothed with whorls of oblanceolate spoon-shaped leaves, 6–9 in each whorl. The drooping flowers with gracefully recurved segments appear during the early summer months 20–30 in erect chandelier-like racemes. In the typical plant they are of a dull purplish-red or violet-rose heavily spotted with carmine on the lower half of the segments. There are several forms of the Martagon Lily, the finest being *album* with stems 4–5 ft. high, carrying 20–30 pure waxy white flowers of great beauty; *dalmaticum* grows 5–6 ft. high, each stem bearing 12–25 flowers varying in colour from pale to deep purple. A form of *dalmaticum* called *Catani* has rich deep almost blackish velvety crimson flowers. There is also a double-flowered form of the common Martagon Lily.

Culture and Propagation. — This species and its varieties are easily grown in light rich loam and leaf soil in partially shaded situations. For flower beds, thin shrubberies, grassy banks, or among Azaleas and Rhododendrons, Martagon Lilies flourish, and if left undisturbed for a few years produce masses of blossom. The white Martagon is particularly handsome in situations where it grows freely, and will produce from 40 to 50 flowers on a stem.

The plants may be increased by offsets from the old bulbs taken about August. The old bulbs should be replanted immediately about 6 in. deep, or not later than September, as later planting often interferes with the production of flowers the following year. Seeds may also be sown as soon as ripe, about July and August, in a well-drained compost of sandy loam and leaf soil, and allowed to grow for a year before disturbing the seedlings. In four or five years the first flowers will appear, but those following will be of greater size, substance, and colour. The variety *dalmaticum* has already been used with *L. Hansoni* to produce the hybrid *L. Dalhansoni*, and doubtless a good deal of work among the Lilies is one of the future tasks of the hybridiser.

L. monadelphum (*L. loddigesianum*). A beautiful and vigorous Caucasian Lily with rather large bulbs and stout stems 3–5 ft. high, clothed with linear lance-shaped acute leaves, ciliated on the margins. In early summer 6–20 large drooping flowers, pale bright yellow, tinged with red at the base, are borne in pyramidal clusters at the end of the stems. The variety *szovitsianum* (also known as *L. colchicum*) is a very fine Lily with beautiful citron-yellow flowers spotted with blackish-purple, hanging like bells at the top of the stems, and sometimes as many as 30 in number.

Culture and Propagation. — These Lilies flourish in rich loam and leaf soil, but take two or three years to attain perfection after the bulbs are planted. They are very attractive in thin shrubberies and borders where they can obtain a little shade for the flowers and shelter for the roots and young growths in spring. In the colder parts of the country the bulbs should be protected with a layer of leaves, litter, bracken &c., as recommended for other kinds. Increase is effected by removing the offsets in early autumn, and planting by themselves. Seeds may also be sown as soon as ripe, and take four or five years to produce flowering bulbs.

L. nepalense, which comes from Nepaul, may be grown in the same way as *wallichianum* in mild parts of the country. It grows 1–3 ft. high, and bears nodding bell-shaped flowers of a beautiful soft yellow, the lower half of the gracefully recurved segments being washed and blotched with a bright purple-brown.

Culture &c. as above, p. 848. This species is probably too tender in the open air for our winters except in the mildest parts. By protecting the bulbs, however, with a good layer of leaves, litter &c., it may prove hardy enough in most parts.

L. pardalinum (*Leopard Lily*).—An attractive Californian Lily having white swollen horizontal rhizomes furnished with scales, in the axils of which bulbs are developed. The stems grow 3–8 ft. high, and are clothed with narrow lance-shaped taper-pointed leaves arranged 9–15 in more or less distant whorls. The drooping bright orange-red flowers, paler in the centre, and heavily spotted with dark purple towards the base, are borne in June and July, in loose clusters at the top of the stems, often 12–30 at a time. There are several varieties of this species, among which may be noted *Bourgæi*, a late-blooming form with crimson-orange flowers heavily blotched with maroon; *californicum* has slender stems 3–4 ft. high, and deep orange-yellow flowers, spotted with maroon and tipped with bright scarlet; *luteum*, with beautiful soft yellow flowers suffused with orange, and marked only at the base with chocolate-brown; *minor*, an early-flowering form, with rather small orange flowers spotted with black, and having the tips of the segments sometimes stained with crimson; *Michauxi* is very free-flowering and late, but otherwise like the type; *pallidifolium* grows about 5 ft. high, and has large flowers, paler in colour than the type, but about twice as large; *Robinsoni* has strong stems 7–8 ft. high, and bright vermilion flowers shading to yellow, and densely spotted with purple-brown.

Culture and Propagation. — The Leopard spotted Lilies should find a place in every garden where Lilies are loved. They are among the hardiest and most free-flowering and flourish in peaty soil or one composed of light loam, peat and leaf soil. They may be grown with *L. canadense* in beds of Azaleas, Rhododendrons &c., where the young growths in spring will be protected from frost. Having rhizomes lie that species, *L. pardalinum* may be increased in the same way. When undisturbed for several years beyond an annual top-dressing of manure, the Leopard Lilies soon become as vigorous and free-flowering as in their native haunts, and increase rapidly by their creeping rootstocks.

L. Parryi.—A beautiful Californian Lily with somewhat rhizomatous bulbs and slender stems 2–6 ft. high, clothed with linear lance-shaped leaves 4–6 in. long, those near the base being arranged in whorls. The citron-yellow nodding or drooping flowers, spotted with pale chocolate or purple-brown, are produced in July, and emit a delicate fragrant odour.

Culture and Propagation.—It is found in a natural state growing in boggy soil, and it has been found to thrive in cultivation when planted in shady spots in a compost consisting chiefly of peat, with a little rich loam and plenty of sand added. The bulbs should be planted 4–6 in. deep, and may be protected in severe winters with a covering of leaves, litter &c. Increase is effected by separating the offsets.

L. polyphyllum. — A charming but rather delicate Lily from the Himalayas, with stems 2–8 ft. high, and linear lance-shaped leaves 4–5 in. long. The drooping flowers appear in June and July, 4–6 in a loose raceme. They are waxy-white in colour, heavily spotted and lined with purple.

Culture and Propagation. — This species is probably too tender for the outdoor garden in most parts of the British Islands. If treated in the mild southern parts of England and Ireland in the same way as *L. cordifolium* and *L. giganteum*, in sandy loam, peat, and leaf soil, it succeeds fairly well. Plants in flower were exhibited in London in 1880, but the species seems to have dropped out of cultivation of late years. *L. nitidum*, a Californian species 2–8 ft. high, with 10–20 bright yellow flowers on a stem, seems to have met the same fate.

L. pomponium. — A fine Lily of the Turk's Cap group, with small yellowish-white bulbs, and erect furrowed stems 2 to 8 ft. high, thickly covered with more or less linear leaves 3–4 in. long at the base, but gradually becoming shorter towards the top. The drooping bright red, orange-tinted flowers, with recurved segments and a strong odour, are borne in loose clustered racemes in summer before those of *L. chalcedonicum* and *L. pyrenaicum*, with which latter species it is often confused. There is a good deal of variation in the colour of the flowers, one form with yellow flowers being very pretty to look at, but having sometimes a disagreeable and at other times rather a pleasant odour.

Culture and Propagation. — The Pompon Lilies flourish in any good garden soil, but prefer a deep rich loam. They look well in masses in beds and borders, shrubberies &c., in either sunshine or shadow, and have an elegant appearance. The bulbs should be planted about 6 in. deep, and as much apart, and new plants may be obtained by detaching the offsets.

L. pyrenaicum. — This Pyrenean Lily is closely related to *L. pomponium*, but is somewhat taller in growth, and bears about a dozen bright yellow drooping flowers at the end of the stems, the gracefully recurved segments, showing the fez-like base of the tube, being elegantly dotted with red or deep purple almost all over the inner surface. There is a red-flowered form very close to *L. pomponium*, but not so good, and the flowers are also peculiar for their strong scent.

Culture &c. as above, p. 843. The plants may be grown exactly in the same way as *L. pomponium.*

L. Rœzli.—An attractive Californian Lily, first introduced to cultivation about 30 years since, but lost until a few years ago. Its place, however, had been taken by a form of *L. pardalinum.* The true species has stems 2–3 ft. high, clothed with lance-shaped linear leaves, which are sometimes partly whorled but usually scattered. The drooping deep orange-red flowers, 2–3 in. across, are produced in June and July, and have the reflexed segments more or less densely covered towards the base with irregular black blotches, while the stamens have golden-yellow to brown anthers. In the plants I have seen only 2 or 3 flowers are open at a time, all borne on more or less erect pedicels sharply bent at the top.

Culture &c. as above, p. 843. The plants grow well in a compost of sandy peat with a little loam, and may be planted among Azaleas, Rhododendrons &c.

L. roseum (*L. thomsonianum; Fritillaria macrophylla*).—A rare Himalayan species 1½–2 ft. high with tufts of narrow lance-shaped leaves 12–18 in. long at the base, but alternate on the stems and much shorter and narrower. The beautiful bell-shaped flowers of a pleasing rosy-lilac or flesh colour appear in April and May, sometimes as many as 40 on vigorous stems. They are at first more or less erect, with segments recurved at the tips, but are eventually drooping.

Culture and Propagation. — This remarkable Lily owing to its early-flowering properties requires to be grown in warm sheltered spots against a south wall or hedge where it will not be injured by spring frosts. The young growths should be protected with a sprinkling of leaves or bracken, and if possible a light should be placed over the plants in severe weather.

The most suitable soil appears to be a rich sandy loam with peat and leaf-soil, thoroughly well drained. As a pot plant for the greenhouse it is very desirable, and may be had in flower with little trouble earlier than out of doors.

L. rubellum. — A beautiful Japanese species of recent introduction, more closely resembling *L. Krameri* than any other, but has flowers of a much softer and more delicate tint. The plant has roundish bulbs and slender stems 1½–2 ft. high clothed with bright green lance-shaped leaves 2–3 in. long and distinctly 5–7-nerved. Grown in the open air, the plants begin to bloom early in June, bearing 5–8 beautiful funnel- or bell-shaped flowers of a more or less deep rosy-pink colour on a stem. They are about 3 in. deep and as much across, and quite unspotted.

Culture &c. as above, p. 843. It has been proved quite hardy in this country, and Messrs Wallace of Colchester, the introducers, recommend a sandy loam as being the best soil for it. As a pot plant it makes excellent decoration for the greenhouse or conservatory, and may be got into bloom early in May or April with a little heat. The flowers have a delicious fragrance and last well when cut.

L. speciosum. — This beautiful and popular Japanese Lily is grown in large numbers, and many fine specimens of it are to be seen in cottage gardens in various parts of the country. It is far better known to gardeners as *lancifolium*, but this name was given by Thunberg to the Lily which is described as *elegans* in this and other works, and had therefore better be discarded in favour of the more appropriate name of *speciosum*. Unfortunately Thunberg also called this species *superbum*, but that name had already been given to a N. American species by Linnæus. The true Japanese *speciosum* (also named by Thunberg) has fair-sized roundish bulbs of a reddish tint and stiff wiry stems 1–3 ft. high, clothed with scattered more or less lance-shaped leaves 4–6 in. long. The beautiful nodding flowers 3–5 in. across are white suffused with deep rose, the lower portion of the reflexed segments being blotched with rose or carmine-purple, and covered with irregular jagged papillæ or surface growths which are sometimes of a deeper rosy-purple colour. Plants cultivated in the open air usually flower in August and September, but may be earlier or later. The blossoms are deliciously fragrant, and last a long time when cut—a fact which makes them much sought after for floral decorations. There are many garden forms of *L. speciosum*, the white ones especially being great favourites for forcing in hothouses. The variety *album* or *albiflorum* is like the type, but the flowers are pure white inside, sometimes tinged with dark red outside; a new form of this has perfectly pure white flowers with golden-yellow anthers; *Krætzeri* is very similar, but its fine white flowers are readily distinguished by the watery green stain down the centre of the segments outside. Among the red, crimson, and rosy-purple varieties may be mentioned the well-known *rubrum* and *roseum* and *roseum superbum* and *formosum*; also *macranthum*, deep rose; *Melpomene*, dark crimson-purple, and its form *cruentum*, brighter in colour and about a fortnight later; *nanum*, late-flowering dwarf form with soft rose blossoms; and *punctatum* with white flowers, spotted and shaded with pink. In addition to these there are monstrous forms in which the stems become very much flattened or fasciated, as often happens with *L. auratum*, and bear masses of white or rose-coloured flowers. These have been called *fasciatum album* and *fasciatum rubrum* respectively, but the fasciation is likely to occur in any form as the result of rich feeding. The variety *gloriosoides* differs from the other forms in having narrow leaves, much reflexed and crisped segments which are covered with scarlet, rather than crimson, spots and papillæ.

Culture and Propagation. — The *speciosum* Lilies flourish in rich loam, peat and leaf soil, with the addition of sharp sand, and treated somewhat in the same way as *L. monadelphum*, in warm sheltered situations. Although I have found them perfectly hardy, it is safer in cold parts of the country, and in severe winters especially, to give the bulbs a covering of leaves, litter &c., and if left in the soil for two or three years, an annual mulching of manure will do them great good. Their vigour, beauty, freedom of flowering late in the year, and their fragrance commend them as most useful and ornamental plants for the flower border.

The plants may be increased by separating the offsets from the bulbs early in spring, and replanting them and the old bulbs immediately, albeit in separate parts of the garden. Bulbils are occasionally produced in the axils of the leaves, and these may be sown in cold frames like seeds, and allowed to grow for a year without disturbance. They will produce flowering bulbs in about 3 or 4 years. Seeds may also be sown when ripe or obtainable in nicely prepared soil. They do not sprout freely or regularly the first spring, and require two seasons as a rule. They are grown under glass and require plenty of light and air, with careful waterings according to the rapidity or the reverse of growth. The third year they may be planted out in light rich sandy soil, and by the end of 4-6 years will reach the flowering stage.

L. superbum.—A fine N. American Lily found growing in swampy parts of the United States, where it is called the 'Swamp Lily.' It is closely related to *L. canadense*, and is often confused with that species. The old bulbs disappear on giving birth to others at the end of long rhizomes or stolons, and the violet-purple stems grow 4-10 ft. high, clothed with whorls of rather firm lance-shaped acute leaves. In July and August loose trusses composed of 6-12 and occasionally as many as 20-40 drooping orange-red flowers heavily spotted with violet-purple are borne on top of the stems, the segments being curled back as in other species of the Turk's Cap section.

Culture and Propagation.—*L. superbum* flourishes in moist peaty soil with a little loam and leaf mould, and should be grown and increased in the same way as its relative *L. canadense*. The variety *carolinianum* (also known as *L. autumnale* and *L. michauxianum*) comes from the S. United States, and is a much dwarfer plant growing only 1-2 ft. high, with fewer leaves, and flowers like those of the type.

L. sutchuenense.—An elegant Chinese Lily 1½-2 ft. high, with slender flexible speckled stems furnished with numerous slender leaves, some of which are about 9 in. long, channelled on the upper surface, and finely speckled all over. In July from 1 to 7 flowers (according to the vigour of the plants) appear, and are light orange-red in colour, the segments being dotted with brown in the centre. *L. Biondi* and *L. chinense*, from China, both with scarlet flowers and with linear leaves, are closely related to this species.

Culture and Propagation.—This new species flowered for the first time in Paris in 1897, and all the plants then in cultivation had been raised from seeds. It flourishes in sandy loam, peat, and leaf soil, and would no doubt prove as hardy as *L. tigrinum* and *L. tenuifolium*, to both of which it is related. It may be readily raised from seeds, which are freely produced by cultivated plants. They should be sown when ripe in cold frames, and allowed to grow for a year before disturbing. Afterwards the young bulbs may be moved annually about March or April, and in about 3-4 years from date of sowing will produce flowers. The bulbs are said to be unproductive of offsets, so that seeds seem to be the best method of increase.

L. tenuifolium (*L. linifolium; L. pumilum*).—An elegant Siberian species with small white ovoid bulbs, and stems 12-18 in. high, thickly covered, especially near the middle, with linear grassy leaves about 2 in. long. The small brilliant scarlet flowers droop at the end of the stems in May and June, but they are not very numerous, and sometimes only one.

Culture &c. as above, p. 843. This species flourishes in light sandy loam with a little peat or leaf-soil, but dreads stagnant moisture at the root. Owing to its early flowering the blooms are apt to be injured by spring frosts, and should be protected with a light, or a screen of thin canvas when open, if at all necessary. Near a south wall in masses is a good place to grow this Lily.

L. testaceum (*L. excelsum; L. Isabellinum*).—A stately Lily supposed to be a hybrid between *L. candidum* and *L. chalcedonicum*, having slender stems 5 to 6 ft. high, densely clothed with narrow leaves. The nodding flowers are freely produced in the summer months, 6-12 in a cluster, and of a beautiful nankeen-yellow or apricot colour, the reflexed segments being dotted with orange-red and furnished at the base with scarcely noticeable papillæ.

Culture &c. as above, p. 843. This ornamental Lily grows freely in ordinary well-drained garden soil, but it likes partially shaded places and should not be exposed to violent winds.

L. tigrinum (*Tiger Lily*). — A well-known Japanese and Chinese Lily with rather large ovoid whitish bulbs, and strong purple-black downy or woolly stems 2–4 ft. high, furnished with dark glossy green linear leaves, in the axils of which bulbils are often produced. The nodding or drooping flowers appear from the end of July to October in loose deltoid racemes, and are of a bright deep orange-red, heavily spotted or 'tigered' with blackish-purple. They are 3–4 in. across, and 8–20 are borne in a truss, making a fine display.

There are a few varieties, that appropriately called *splendens* being probably the best. It often reaches a height of 7 ft., and bears as many as 25 flowers, which are not only larger but also more brightly coloured and more heavily blotched with dark purple than the type. *Fortunei* is about the same height when well grown, and flowers rather earlier than the others. The variety *flore pleno* is readily distinguished by having 4–6 circles of petals instead of one, coloured and spotted like the ordinary Tiger Lily.

Culture and Propagation.—All the Tiger Lilies are easily grown in well-drained sandy loam with a little leaf mould, or a top dressing of well-rotted manure added. An open but sheltered and partially shaded situation suits them best. The plants are readily increased by offsets from the bulbs and by the bulbils from the axils of the leaves. The bulbils if not collected will drop on the soil and root. By sowing in cold frames, flowering bulbs will be produced in about 3 years. The full-grown bulbs should be planted 6–9 in. deep.

L. umbellatum.—Under this name are grouped a number of Lilies of garden origin, probably hybrids between forms of *croceum*, *elegans*, and *davuricum*. The prevailing colours are orange, orange-red, apricot &c., some varieties being wholly of one colour, while others are more or less heavily blotched and spotted with blackish-purple. Other forms in this variable group are *punctatum*, *erectum*, *grandiflorum*, *aurantiacum*, *biligulatum*, *multiflorum*, *fulgidum*, but some of them are interchangeable with forms of *elegans* and *croceum*, which see.

Culture &c. as above.

L. wallichianum.—A fine Himalayan Lily with thick stems 4–6 ft. high, clothed with narrow linear leaves 6–9 in. long, and ending with 1–3 white funnel-shaped flowers, greenish towards the base and very sweetly scented. The form known as *superbum* (or *sulphureum*) has large tubular white flowers, tinged with yellow within, and suffused with rose outside.

Culture and Propagation. — This species is considered too tender as a rule for outdoor cultivation, but it may be successfully flowered in the open air in the southern counties during the summer. It should be grown in a deep well-drained sandy loam and leaf-soil, and may be protected in winter with leaves, litter &c. New plants may be obtained by detaching the offsets from the bulbs in autumn, and also by means of the bulbils which are often borne in the leaf axils, as in the case of *L. bulbiferum*, *L. tigrinum*, and a few others already mentioned in the preceding pages.

L. washingtonianum. — A beautiful Californian Lily 3–6 ft. high, with whorls of oblanceolate leaves 4–5 in. long, and terminal racemes of more or less drooping funnel-shaped flowers, 3–4 in. long, pure white, tinged with purple or lilac, and sweetly scented. The variety *purpureum* has white flowers spotted with red, turning purple with age. *Rubescens* is a vigorous form bearing 12–15 flowers in a truss when well grown, at first white, but soon becoming suffused with rosy-pink. These Lilies are best in rich loam, peat, and leaf soil in partially shaded and warm situations. Some years ago a variety named 'Scott Wilson' was raised by Mr. G. F. Wilson of Weybridge from seeds sown in 1878. It flowered in June 1881 and bore orange-yellow blooms spotted with brown.

Culture &c. as above, p. 848. The Washington Lily will thrive in good garden soil, but it is apt to die out after a few years, unless it is continuously renewed by means of growing on the offsets or seeds whenever obtainable. Good drainage of the soil is an essential point in its cultivation.

FRITILLARIA (Fritillary). — A large genus of bulbous plants with simple leafy stems and nodding or drooping Lily-like flowers. Perianth bell-shaped, consisting of 6 nearly equal oblong or ovate segments, each with a nectar-bearing hollow at the base inside. Stamens 6, hypogynous, or slightly adhering to the base of the segments. Style 3-cleft.

Culture and Propagation.—There are over 50 species of Fritillarias known, all being natives of the north temperate zone; but most of them although interesting are not very showy in colour, and are therefore not so likely to be grown in private gardens as in botanical collections. The more showy kinds are suitable for the flower garden and rockery and also for massing on grassy banks and slopes, arranged according to height. Ordinary good garden soil will suit most of them, and the bulbs may remain for several years without being lifted. They produce offsets freely in the same way as Lilies, and by this means new plants are obtained. The foliage should be allowed to wither before the plants are touched. Some kinds also ripen seeds. These may be sown as soon as ripe in light sandy soil in pans or boxes and should not be disturbed for at least one year. The young bulblets are then given a little more room, and so on every year until in about 4 or 6 years they reach the flowering stage, very much in the same way as Lilies.

The following are some of the more showy kinds suitable for the hardy flower garden:—

F. aurea. — A Cilician species with rather glaucous stems about 6 in. high, and linear fleshy somewhat glaucous leaves 2–3 in. long. The bright yellow solitary drooping bell-shaped flowers about 1 in. deep appear in spring, andare sometimes spotted or chequered with brown.

Culture &c. as above. A good plant for the rock garden.

F. camtschatcensis (*Lilium nigrum*). *Black Lily.* — A distinct species from Kamtschatca, Siberia &c., about 9 in. high, with lance-shaped leaves, the lower ones being whorled, the upper ones opposite or solitary. The bell-shaped drooping flowers appear in May and June, and are of a deep blackish-red, becoming paler towards the base of the oval lance-shaped segments which are spotted with deep purple.

Culture &c. as above. This grows best in moist peat and sandy loam, and requires sheltered nooks in the rockery. The bulbs are eaten by the natives in a wild state.

F. delphinensis. — A pretty species from the Alps of Dauphiny, 6–12 in. high, with 4–6 linear or oblanceolate leaves and solitary vinous-purple yellow-spotted flowers drooping from the top of the stem. The variety *Burnati* has plum-coloured flowers about 2 in. deep, chequered with greenish-yellow; *Moggridgei* is a very handsome variety from the Maritime Alps, where it flourishes at an elevation of 5000–7000 ft. It has large cylindrical yellow flowers, drooping like bells, and chequered or tessellated inside with brownish-crimson.

Culture &c. as above. A good plant for the rock garden and grassy slopes.

F. imperialis (*Crown Imperial*). — A vigorous and well-known plant 2–3 ft. high, native of Persia, with broad bright shining green wavy leaves, and a dense cluster of large drooping bell-shaped flowers at the top of the stem, which is surmounted by a tuft of leaves. The flowers appear in April, and are about the size of ordinary Tulips, and vary in colour from bright yellow to crimson. This variation has given rise to many names of forms: hence we find *Aurora*, bronzy - orange; *lutea*, yellow; *rubra* and *rubra maxima*, red; *aureo-marginata*, having the leaves edged with yellow; *Orange Crown*, orange-red; *sulphurine*, orange; *Slagzwaard*, large deep red flowers on flattened or fasciated stems. There is also a form with double red flowers.

Culture and Propagation. — The Crown Imperials like a deep rich loamy soil, and are suitable for the margins of shrubberies, flower borders &c. They look very handsome in bloom, but they emit such a strong odour when cut that they are known in some parts by the appropriate but uncomplimentary name of 'Stink Lilies.' They are easily increased by means of offsets.

F. Karelini (*Rhinopetalum Karelini*). An Asiatic species about 6 in. high, with broad stem-clasping leaves, and terminal racemes of nodding bell-shaped flowers about 1 inch deep, produced late in autumn or in spring according to the time of planting. The blossoms are pale purple with deeper purple spots and veins, and a greenish-yellow nectary-hollow at the base of each segment.

Culture &c. as above. It likes light well-drained soil, and is suitable for warm corners of the rockery.

F. lutea. — A Caucasian species 6–12 in. high, with alternate linear lance-shaped leaves, and solitary drooping yellow flowers more or less tinged with purple, produced in April and May. The variety *latifolia* has broader leaves than the type, the upper ones being opposite, and the flowers vary in colour from plum-purple to pale green chequered with brown or yellow.

Culture &c. as above.

F. Meleagris (*Snake's Head*). — This distinct and pretty species grows wild in parts of England in moist meadows. It is 12–18 in. high, with flat linear leaves 6–8 in. long, and usually solitary flowers 1½ in. deep, drooping from the summit in April and May, and beautifully chequered with light or dark purple or a yellowish-white ground. There are white, rosy, and purplish forms, and also one with double flowers. *Nigra*, *major*, *pallida*, *flavida*, are other names relating to colour or size.

Culture &c. as above. The Snake's Head Fritillary is excellent for naturalising in grass—indeed that is its natural place—but in the garden it should be planted in places where it will not require moving until the leaves begin to fade. The plants may also be grown in the rockery and flower border. In Christchurch meadows at Oxford, which are often flooded by the overflowing of the Cherwell, some thousands of Snake's Head Fritillaries appear year after year, and have a wonderful effect when in blossom.

F. pallidiflora. — A beautiful and distinct Siberian species about 9 in. high, having large glaucous-blue leaves and 2–3 yellow Tulip-shaped flowers nodding from the end of the stem, and beautifully chequered with rose or purple within.

Culture &c. as above.

F. persica. — A distinct and curious Persian species about 3 ft. high, with slightly scented deep violet-blue flowers. The variety *minor* has smaller flowers and protruding stamens.

Culture &c. as above.

F. pudica.—A handsome little species, 4–6 in. high, native of the Rocky Mountains. It has erect linear glaucous leaves, and produces one or two bright yellow drooping flowers about 1 in. deep in April and May.

Culture &c. as above. A pretty plant for warm nooks in the rockery, or grown in pots it is useful for cold greenhouses.

F. recurva. — A distinct Californian species with slender purplish stems about 2 ft. high, remarkable for its bright orange-scarlet flowers, with reflexed segments, the inner surface being yellow and blotched with purple. The drooping flowers appear in April and May, and sometimes as many as nine are borne on one stem.

Culture &c. as above. This species is rather tender and requires protection with leaves, straw &c. in winter. Warm sunny spots and rich sandy loam appear to suit it best.

F. Sewerowi (*Korolkowia Sewerowi*). A curious species about 18 in. high, native of Turkestan. It has round glaucous stems and oblong leaves, rather glaucous when young. The drooping flowers are borne in loose racemes, and are of a lurid or plum-purple outside, with a glaucous hue, and greenish-yellow within, without any markings. There is a variety called *bicolor*, with pale olive-green flowers having a brownish crescent-shaped blotch at the base of each segment.

Culture &c. as above.

F. Walujewi.—Also a native of Turkestan, about 1 ft. high, with linear leaves tapering into a tendril like those of *F. verticillata*, and large solitary silvery-grey flowers, washed with purple-brown or blood-red within and spotted with white.

Culture &c. as above.

The following less showy species and varieties are in cultivation, and a list of them may be useful for reference.

Acmopetala, purple and greenish. Asia Minor; *Armena*, soft yellow. Armenia; *Atropurpurea*, maroon, spotted yellow. N.W. America; *Biflora*, yellow, marbled black. California; *Bornmülleri*, golden yellow. Asia Minor; *Bucharica*, white, tinged with green or purple. Bulgaria; *Burneti*, brownish-red chequered with white. S. Europe; *Californica*, maroon-yellow, flaked crimson. California; *Canaliculata*, purple. Kurdistan; *Citrina*, green, shaded citron-yellow. Asia Minor; *Contorta*, remarkable for having the petals united instead of free, white; *Dasyphylla* and *Ehrharti*, purple and yellow. Greece; *Græca*, dark rose, edged green. Greece; *Hericaulis*, dark purple. Asia Minor; *Involucrata*, plum-purple. Maritime Alps; *Lanceolata*, purple, chequered yellow.

N.W. America; *Libanotica*, bronze and olive. Syria; *Liliacea*, white outside, green within. California; *Lusitanica*, soft yellow. Portugal; *Meleagroides*, dark purple. Altai Mts.; *Oranensis*, bright purple and yellow. Algiers; *Pontica*, yellow-green flushed rose, green-spotted inside. Asia Minor; *Pyrenaica*, deep purple, yellow inside. Pyrenees; *Raddeana*, greenish-yellow like *imperialis*. Central Asia; *Ruthenica*, deep violet-purple. Caucasus; *Tenella*, yellowish, chequered purple-brown. Europe; *Thunbergi*, white. Japan; *Tulipifolia*, glaucous-blue. Kurdistan; *Verticillata*, whitish-green, spotted purple inside. Siberia; *Whittalli*, golden-yellow. Asia Minor; *Zagrica*, lurid purple, glaucous outside. Persia.

TULIPA (Tulip).—A genus of beautiful and easily recognised plants having tunicated brown-skinned bulbs, broad or linear leaves, and simple erect scapes ending in one, or rarely 2–3 erect or very rarely nodding flowers. The bell-shaped, cup-like, or somewhat funnel-shaped perianth consists of 6 distinct more or less highly coloured segments, quite free and arranged in 2 circles of 3 each. Stamens 6, hypogynous, shorter than the segments. Stigma sessile, 3-lobed. Capsule 3-celled, many-seeded.

The Tulip is without doubt one of the best and most brilliant flowers for the hardy flower garden during the spring and early summer months. Some of the sorts begin to bloom as the last of the earlier Daffodils are disappearing, and it is often well into May and June before the last Tulip begins to fade. The garden forms, especially the clear self-coloured ones, are so rich, brilliant, and diverse in colour that they should be grown in as large quantities as space will allow. Tens of thousands of bulbs can now be purchased for the same price that was often willingly given for a single bulb in the days of the Tulip craze in the 17th century—a craze that eventually ruined many who trafficked in Tulips as if they were stocks and shares, and who really cared little or nothing for their natural beauty. The individual blooms last a long time in perfection, and are valuable for cutting for floral decorations &c. They are always best cut early in the morning before the sun causes them to expand, and when the petals are more or less contracted into a point. This is only a detail, but it is an important one where a large number of cut flowers are used.

Culture and Propagation.—Tulips flourish in all good garden soils rich in humus and well-drained. Fresh manure should be avoided, and if the beds are raised drainage will be improved. The bulbs may be planted about 4–6 in. deep, and as far apart. From the end of September to November is the best time for planting. The bulbs may be inserted in holes made with a bluntish dibber that will not go beyond the depth required, or open drills may be drawn, and covered in after planting.

Although a patch of mixed Tulips looks very handsome owing to the various colours, on the whole finer effects are obtained by keeping each variety by itself. Some have long stems and some short, while others are intermediate in height, and if planted without regard to this fact the result is uneven and defective. Two or even three kinds may be used in the same bed, and where known, the taller stemmed kinds should be planted in the centre and the shorter near the edge. In the case of mixed varieties it is a safe rule to plant the largest and finest bulbs in the centre, as they are most likely to throw up tall vigorous scapes.

Warm sunny situations sheltered from violent winds and from the north and east are the best for Tulips, but otherwise they like an open airy place. They should never be planted under trees, near walls, or in deep shade. After planting the soil may be covered with such plants as Forget-me-not, Silene, Polyanthuses, Primroses, Pansies and Violets, mossy Saxifrages, but if the bulbs are not put into the ground until the end of November it will be rather too late to move some of these, especially if the weather is unfavourable. A top-dressing of well-rotted manure in winter will benefit the bulbs and keep the ground free from weeds. Where this is considered too unsightly, a layer of coco-nut fibre will give the Tulip beds a neat clean appearance, and make an excellent background for the flowers and foliage later on.

Tulips may be increased by offsets and seeds. Some kinds seldom or never produce offsets, and in such cases seeds alone if obtainable must be used to increase the stock.

As the vegetation of a Tulip differs

somewhat from most other bulbous plants belonging to the Lily order, it deserves mention. The bulb planted in the autumn is not that which is lifted the following June or July. The original bulb has vanished in producing leaves, flowers, next year's bulb, and offsets; hence there is no strain upon it when allowing the flower to wither and produce seeds. The bulb for the second season is usually fully formed with roots of its own almost by the time its parent begins to flower. From its side is produced a smaller bulb or offset, and this two years later becomes a flowering bulb. The practice therefore that holds good with other bulbous plants, namely, that of allowing the leaves to wither before lifting the bulbs, is not so applicable to the Tulip, which may be lifted as soon as ever the flowers have passed from a state of perfection, whether the leaves are green or not. Of course when seeds are required the plants must not be disturbed until the seed-pod has thoroughly ripened.

Tulips may be left in the soil for two or more years, and may be top-planted with annuals like China Asters, French and African Marigolds, Clarkias, Gaillardias &c., but as a rule it is better to lift them annually after flowering is over. If lifted while the leaves are still green, the new bulbs retain their beautiful deep brown skin, but if the operation is delayed until the foliage has vanished, the bulbs have to be handled more carefully, otherwise their skins will peel off readily leaving the white flesh of the bulbs exposed. Little or no harm, however, is caused thereby. The bulbs which are to flower the following season should be cleaned and stored on dry shelves in cool airy sheds or other places free from rats and mice until the autumn. Any offsets that are produced may be detached and planted as early as possible in specially prepared beds by themselves, where they may be either left till they bloom two years afterwards, or taken up the following year, and planted in the ordinary way in autumn.

Seedling Tulips

Raising Tulips from seeds is a slow but interesting process and presents no great difficulty. The seeds may be sown as soon as ripe very thinly in the open border in a specially prepared bed. The seeds do not germinate until the following spring, and time is saved if the young plants are allowed to remain in the seed-bed until they flower. When sowing the seeds plenty of space should be therefore left for the production of offsets, or 'droppers,' and 4–6 years may elapse before the first flowers appear. A curious fact in connection with the flowers of seedling Tulips is that they are always of one uniform colour, although the seeds may have been saved from flowers beautifully feathered and flamed and with two or three distinct colours. Seedling Tulips are called 'breeders' or 'mother Tulips' by florists, and they retain the name so long as the flowers remain of one colour. They may, however, at any time 'break' away into beautifully feathered and flamed flowers. They are then said to be 'rectified' or 'broken.' Having reached this stage florists split these 'rectified' Tulips into two groups, viz. those having a pure white centre, base, or ground, and those having a pure yellow one. Those having a white base, and the purer the white the better, are divided into two sections: (1) *Roses*, in which the flowers may be of delicate pink, rose, scarlet, cerise, crimson, and intermediate shades of colour; and (2) *Byblœmens*, in which the flowers may be shades of pale lilac, lavender, violet, purple, brown, and black, and the deeper and blacker in colour they are the better. Tulips having a yellow base or centre consist of one class only called *Bizarres*, and their flowers may be orange, scarlet, crimson, black, brown &c.

All 'rectified' Tulips, whether 'roses,' 'byblœmens,' or 'bizarres,' have the petals either 'feathered' or 'flamed,' and thus are readily distinguished from the self-coloured breeder Tulips. This latter group, however, can easily be fitted into any of the three groups mentioned by the white colour or yellow centre, and the prevailing colour of the flowers, as stated under each.

A 'feathered' Tulip is one in which the colour is beautifully pencilled and feathered round the edges only of each petal, thus producing a light and graceful effect. When the feathering is broken, splashed, or confused, it is a defect.

A 'flamed' Tulip is beautifully pencilled like the feathered group, but is distinguished from it by having strong and brilliant streaks, bands, or flames of a distinct colour shooting up the centre from near the base, and forking out towards each feathered edge. The 'flaming' and 'feathering' should be well blended, but always leaving the ground colour pure and clear between them.

These are the real florist's Tulips, as distinguished from the bedding, Darwin, and Parrot Tulips. They are much dearer than these, and require a good deal of skill and careful cultivation to bring them to perfection, that is, to the state as laid down by members of the National Tulip Society. Years ago these Tulips were very popular, and almost every village had its Tulip Society. Now, however, there are very few who retain the old love for producing this particular class of Tulip, and they are mostly confined to Lancashire, Yorkshire, and Notts.

The Rev. F. D. Horner, a successful and enthusiastic cultivator, has defined a good florist's Tulip as one having a round cup-shaped flower, with a good shoulder, and petals level at the top, neither reflexing outwards, nor curving inwards at their upper edges. The base of the cup inside must be white or yellow, according to the class, and free from any stain; and the filaments, upon which six bold black anthers stand, must be pure as the ground colour. The petals should be smooth on the edge and of good substance, that their colours may appear dense, and the flower keep its shape. Breadth of petal is a most valuable property, otherwise the flower, as it expands and grows, would show strips of daylight through the base of the cup, a deadly fault known technically as 'quartering.'

Of course there are all kinds of mixtures even among the florist's varieties, and Roses, Bizarres, and Byblœmens get mixed up with each other, causing peculiar combinations. From a flower-garden point of view, probably the 'breeder' Tulips are most effective on account of their bright uniform colours, but any one seeing a fine show of the best florist's varieties in May is not likely to forget their beautiful shape and colouring.

The following is a selection of the Tulips used for the outdoor garden, after which will be found descriptions of the natural species. Many of the kinds mentioned below are imported by the million from Holland every autumn, and are extensively grown in hothouses for winter decorations.

1. Florist's Tulips

'Byblœmens'—Rectified

Adonis, purple and black on white; *Agnes*, dark purple on white; *Bessie*, brilliant purple on white, dwarf; *Bienfait Incomparable*, purple, black on white; *Black Diamond*, glittering black on white, tall; *David Jackson*, black on white, colour heavy; *Duchess of Sutherland*, lilac on white; *Friar Tuck*, purple on white, markings very fine; *George Hardwicke*, violet and glistening black on white; *Glory of Stakehill*, rich purple on white, large flower; *Holmes' King*, very faintly marked, pale lilac on white, tall and large-flowered; *King of the Universe*, fine large flower, black on white; *Lord Denman*, puce-purple on white, flowers beautifully marked, a grand variety for massing in beds and borders; *Mrs. Jackson*, black on white, fine short-petalled flower; *Mrs. Pickerell*, deep plum-purple on white; *Pandora*, fine heavy violet beam on white ground, pretty; *Pick-me-out*, shining chocolate-crimson on white, with glittering white base; *Prince Leopold*, rosy-purple on white; *Princess Royal*, crimson-black on white, late; *Proserpine*, lightly feathered black on white, of perfect form; *Queen of May*, dark crimson on white; *Salvator Rosa*, purple-black on white; *Talisman*, violet-black on white; *Wedding Coat*, feathered black on a dazzling white ground.

'Byblœmens'—Breeders or Self-Coloured flowers

Adonis, rich violet-purple; *Agnes*, rich purple; *Ashmole's* 114, light heliotrope, champagne-glass-shaped; *George Hardwicke*, deep heliotrope; *Glory of Stakehill*, deep red-purple, large flower; *Leach's No.* 1, pale lilac, of beautiful form; *Leach's No.* 2, dark purple; *Martin's* 117, fine soft heliotrope, extra fine; *Miss Foster*, lilac, flushed fawn, distinct; *Miss Hardy*, light purple, large flower; *Music*, large purple, of fine form, very handsome; *Philip I.*, lovely heliotrope, of fine form; *Storer's No.* 19, deep purple; *Talisman*, slaty purple.

'Roses'—Rectified

Aglaia, rose on white; *Alice*, crimson-rose on white, dwarf; *Anastasia*, rich crimson on white, tall; *Annie McGregor*, brilliant rose-scarlet on white; *Comte de*

Vergennes, rosy-purple on white; *Flora McIvor*, brilliant rose-scarlet on white; *Heroine*, deep rose on white; *Industry*, bright scarlet-cerise on white; *Kate Connor*, feathered rose on white; *Lord Derby*, brilliant rose-scarlet on white; *Mabel*, beautiful rose on white; *Modesty*, beautiful soft rose on white; *Mrs. Lee*, feathered, rich scarlet-cerise on white; *Sylph*, rose on white; *Triomphe Royale*, deep rose on white.

'Roses'—Breeders or Self-Coloured

Annie McGregor, deep rose-scarlet; *Hepworth's Rose*, beautiful light rose; *Industry*, intense scarlet-cerise; *Kate Connor*, lovely clear soft rose; *Lady Constance Grosvenor*, lovely cerise-rose colour; *Lord Derby*, brilliant rose-scarlet; *Mabel*, beautiful soft rose; *Modesty*, clear rose; *Rose Hill*, deep carmine-rose, large dazzling white base.

'Bizarres'—Rectified

Accuracy, maroon-brown on gold; *Ajax*, rich chocolate on yellow; *Caliph*, black on lemon, very decorative; *Colbert*, chocolate on bright golden-yellow, dwarf; *Criterion*, deep maroon on gold; *Dr. Colenso*, rich orange on bright lemon, dwarf; *Dr. Hardy*, dark scarlet on bright orange-yellow; *Dr. Hutcheon*, dark chocolate on yellow; *Duke of Devonshire*, chocolate-black on lemon, large showy decorative variety; *Excelsior*, chocolate on yellow; *George Hayward*, rich crimson-maroon on gold, a grand bedder; *Goldcup*, brown on gold; *James Wild*, black on lemon, handsome; *John Heap*, bright red-brown on yellow; *Lord Lilford*, dark chocolate on yellow; *Lord Frederick Cavendish*, bright mahogany on gold; *Lord Stanley*, mahogany-crimson on yellow, short broad-petalled perfectly formed flower; *Major Chard*, red-brown on orange-yellow; *Masterpiece*, black on yellow; *Michael Angelo*, maroon-black on canary-yellow; *Mr. Pickwick*, maroon-brown on pale yellow; *Pilot*, deep brick-red on yellow; *Richard Yates*, scarlet-maroon on gold, very prettily marked flower; *Samuel Barlow*, glowing scarlet-crimson on glittering golden ground; *Sir Joseph Paxton*, handsome maroon-black on lemon; *Sir Moses Montefiore*, handsome dark brown on gold; *Sir W. Hardinge*, handsome heavy brown beam on bright lemon ground; *Sulphur*, mahogany-brown on yellow, delightfully sweet-scented; *Sunbeam*, chocolate-brown on gold, dwarf; *Tippoo Tib*, very distinct, with broad chocolate-black beam on lemon-yellow ground; *William Wilson*, crimson-bronze on yellow.

'Bizarres'—Breeders or Self-Coloured flowers

Criterion, crimson-maroon; *Dr. Hardy*, rich mahogany-brown, a handsome flower; *Excelsior*, self-brown; *Goldfinder*, bright scarlet, clear rich yellow base; *Helen Fawcett*, maroon-brown, fine short-petalled variety; *James Wild*, deep olive-brown, very handsome; *John Heap*, bright orange-scarlet, edged gold; *King*, dark maroon-brown, large and handsome; *Lord Frederick Cavendish*, bright mahogany-brown, large and handsome; *Lord Stanley*, rich deep maroon, short-petalled flower, of fine form; *Masterpiece*, golden-brown; *Richard Yates*, a very pretty scarlet-maroon; *Sam Barlow*, large rich mahogany-brown; *Sir Joseph Paxton*, dark chocolate-brown; *Storer's No.* 1, mahogany-brown, small flower, strongly bee-bread-scented; *Sulphur*, light olive-brown, an æsthetic shade, very sweetly scented; *William Lea*, rich glossy maroon-black, very handsome; *William Mellor*, light brown; *William Wilson*, golden-brown.

2. BEDDING TULIPS

This popular class of Tulips has been derived chiefly from *T. gesneriana*, as have also the florist's Tulips above described. They may be grown in beds or borders in large masses, the bulbs being 4–6 in. apart, to obtain the finest effect. Some of the earlier flowering kinds like *Duc van Thol* are supposed to have descended from *T. suaveolens*, but they cannot compare in size, beauty, or colour with those from *T. gesneriana*. As it is very often required to plant Tulips according to their colours, the varieties have been grouped thus for the sake of convenient reference, the single and double varieties being kept distinct from each other. Their culture and propagation are as described above, p. 860.

SINGLE TULIPS

Scarlet, Rose, Crimson, and Pink shades.—Adelaine, Artus, Bacchus, Belle Alliance, Couleur de Cardinal, Crimson

King (Roi Cramoisi), De Keyzer, Duc van Thol (scarlet, rose, and crimson shades), Dusart, Jules Janin, La Riante, Le Matelas, Maas, Miranda, Pottebakker (scarlet), Princess Wilhelmina, Proserpine, Rachel Ruisch, Rembrandt, Rosamundi Huykman, Rose Aplatie, Rose Brillante, Rose Luisante, Rose de Provence, Rose Gris de lin, Rose Queen, Rose Tendre, Samson, Scarlet Beauty, Stanley (Cramoisie pourpre), Van Berghem, Vermilion Brilliant, Vesuvius.

Natural Species. — Carinata rubra, Eichleri, elegans, Gesneriana, Greigi, fulgens, Hageri, macrospeila, maculata, Didieri, dammanniana, kolpakowskyana, Korolkowi, lanata, linifolia, Oculus Solis, ostrowskiana, montana, undulatifolia.

Orange, Brownish, and Terra Cotta shades. — Cardinal's Hat, Commandant, Duc van Thol (orange), Leonardo da Vinci, Prince of Austria, Thomas Moore.

Yellow Shades. — Bouton d'Or, California, Canary Bird, Chrysolora, Duc d'Orange, Gold Finch, Golden Crown, King of the Yellows, Mon Trésor, Ophir d'Or, Pottebakker (yellow), Prince de Ligne, Yellow Prince.

Natural species. — Batalini, flava, himalayensis, billietiana, Didieri var. Kesselringi, Orphanidea, retroflexa, sylvestris.

White, or Blush. — Albion (White Hawk), Alba regalis, Comte de Mirabeau, Grootmeister van Maltha, Jacht van Delft, Jacoba van Beyeren (White Swan), Jan Steen, Joost van Vondel, La Laitière, La Reine, L'Immaculée, Nelly, Pax alba, Pigeon, Pottebakker (white), Princess Marianne, White Swan.

Natural species.—Clusiana.

Purple and Violet shades.—Eleonora, Molière, Paul Moreelse, Potter, Purple Crown, Van der Neer, Wouverman, Queen of the Violets (President Lincoln).

Shades of Red, Rose, Pink, or Violet, and White. — Admiral Reinier, Alida Maria, Belle Lisette, Bride of Haarlem, Cerise Gris de lin, Cameleon, Cottage Maid, Couleur ponceau, Donna Maria, Globe de Rigaut, Joost van Vondel, Roi Pepin, Spaandonk, Standard Royal (silver), Wapen van Leiden, Zomerschoon.

Red and Yellow. — Brutus, Duc de Berlin, Duchesse de Parma, Duc Major, Keizerskroon (Grand Duc), Standard Royal (golden).

Natural species.—Suaveolens.

DOUBLE TULIPS

Scarlet and Crimson shades.—Agnes, Arabella, Imperator Rubrorum, Lady Grandisson, Le Matador, Pæony Red, Rex Rubrorum, Rose Crown, Rubra maxima.

Pink and Rose shades. — Arabella, Couronne des Roses, Le Blason, Lucretia, Murillo, Raphael, Rose Aimable, Rose d'Amour, Salvator Rosa.

White. — Alba maxima, Blanche hâtive, Grand Vainqueur, La Candeur, Rose Blanche.

Red and Yellow.—Duc de Bordeaux, Duc van Tholl, Gloria Solis, Helianthus, Pæony Gold, Regina Rubrorum, Titian, Tournesol, Velvet Gem, Princess Alexandra, Admiral Kingsbergen, Buonaparte.

Orange or Yellow shades.—Couronne d'Or, Miaulus, Tournesol, Leonardo da Vinci, Yellow Rose, Miroir.

Various.—Bakker or Brown Tournesol (brown and yellow), Cousine and Turban Violet (violet), Duke of York (carmine and white), Gris de lin pale (violet and white), Purple Crown (deep purple), Queen Victoria (purple-red), Rosina (semi-double pink), Wilhelm III. (orange-scarlet), Blue Flag (violet-blue), La Belle Alliance (blue and white), Rhinoceros (rosy-violet).

White, with Red, Crimson &c. shades. — Couronne impériale, Gloriosa, Hercules, Mariage de ma fille.

3. PARROT OR DRAGON TULIPS

These remarkable flowers are supposed to be derived from the curious green and yellow striped *T. viridiflora*, and are easily recognised on account of their peculiar and richly coloured flowers, the petals of which are cut and slashed into fantastic shapes. They make a brilliant display in the garden with their glowing scarlet and yellow flowers. Unlike most of the Bedding varieties they cannot be forced into early flower by heat. They are also somewhat uncertain in flowering, and to avoid disappointment, as well as gaps in the border, it is well to plant them rather closely, say 2-3 in. apart.

The following are the principal varieties, sold either separately or mixed.

Admiraal van Constantinopel, glossy red, shaded and tipped with orange; *Aurantiacum*, extra fine orange; *Café*

Brulée, dark brown; *Couleur de Café* (Coffee Colour), brown and deep yellow; *Crimson Beauty*, deep crimson, with black markings; *Fire King*, dark scarlet, striped gold; *Lutea Major*, yellow, fine; *Perfecta*, yellow and scarlet; *Rubra et Lutea*, red and yellow; *Rubra Major*, scarlet, extra fine, true.

4. Darwin Tulips

These are really self-coloured forms of *T. gesneriana*, and are considered by many superior to the 'Breeder' Tulips on account of their more brilliant colours and the shape and size of the blossoms. The strain was raised by a Flemish amateur. The stalks average 18–24 in. high, and the flowers are excellent for cutting and decorations. The following kinds are known best:—

Apricot, deep apricot shaded yellow, large flower; *Bronze King*, large golden-bronze; *Carminea*, glowing carmine-rose, tall and very fine; *Coquette*, rich soft rose margined blush, very pretty; *Cordelia*, glowing violet-crimson, very distinct and handsome; *Dorothy*, pale mauve, shaded white, very pretty, late-flowering; *Early Dawn*, rosy-lake, shaded blush; *Flambeau*, brilliant scarlet with blue centre; *Glow*, brilliant glowing vermilion, centre blue, margined white; *Gipsy Queen*, large handsome dark maroon, tall grower; *Hecla*, very deep crimson-maroon, fine cup-shaped flower, handsome; *Joseph Chamberlain*, large brilliant cherry-scarlet; *Loveliness*, lovely bright glowing satiny rose, margined blush; *May Queen*, large and beautiful soft rose, tall grower; *Peter Barr*, very dark rich maroon, large flower; *Phyllis*, white, shaded pale rose-lilac; *Purple King*, bold globular flowers, ruby-purple, white centre; *Queen of Brilliants*, large deep full rose, shaded scarlet; *Queen of Roses*, pretty full bright carmine-rose; *Salmon King*, rich deep glowing salmon-rose, shaded scarlet; *The Shah*, rich dark cherry-rose, of perfect form, tall grower; *The Sultan*, rich glossy maroon-black; *Violet Queen*, large rich ruby-violet; *White Queen*, when in bud a soft rosy-white, but expanding into a beautiful creamy-white, a very charming variety, flower large; *Zephyr*, pretty soft violet-rose with large white centre.

5. Natural Species of Tulips

The Wild Tulips are not at all well known in gardens, and many of the kinds described below are still very rare. They are very interesting, and on the whole beautiful, but only a few like *gesneriana*, *Greigi*, *Oculus-Solis*, and *suaveolens* approach the bedding kinds in brilliancy of colour.

T. acuminata (*T. cornuta; T. turcica*). A curious species of unknown origin, but easily recognised by its long, narrow-pointed segments, the flowers being red, yellow and speckled.
Culture &c. as above, p. 860.

T. Alberti.—A native of Turkestan about 2 ft. high, with glaucous-green wavy leaves, and orange-scarlet flowers 2 in. deep, faintly blotched with reddish-brown, the stamens having short black filaments and yellow anthers. Very rare.
Culture &c. as above, p. 860.

T. altaica.—A native of the Altai Mountains at an elevation of 1000 to 6000 ft., usually having 3 lance-shaped leaves and carmine-red flowers with a yellow centre, borne in April on downy stalks 3–4 in. high. Very rare.
Culture &c. as above, p. 860.

T. australis (*T. breyniana; T. celsiana*).—A native of S.W. Europe, closely related to our Wild Tulip *T. sylvestris*, but readily distinguished from that by its dwarf habit, star-shaped yellow flowers flushed with red, and broad and somewhat reflexed leaves. *T. triphylla* from Turkestan, with greenish-yellow flowers, is closely related, as is also *T. humilis* from Persia, with pale yellow flowers tinged with red outside.
Culture &c. as above, p. 860.

T. Batalini.—A dwarf species 4–8 in. high, with prostrate foliage and creamy-yellow flowers about 3 in. deep, and having a fine thin line of red or crimson on the extreme edge of the petals.

Culture &c. as above, p. 860. This makes a very attractive display in the flower border during April and May if grown in bold groups. It is also suitable for choice corners of the rockery in masses.

T. biflora.—A Caucasian Tulip, chiefly remarkable for producing clusters of 2–5 creamy-white flowers with a yellow centre and tinged with green outside, on a stalk 3–6 in. long.
Culture &c. as above, p. 860.

T. billietiana.—A native of the Alps, with oval, lance-shaped, wavy leaves, and flowers of a uniform bright yellow, 2–3 in. deep, becoming tinged with orange-red soon after opening.

Culture &c. as above, p. 860.

T. Borszczowi.—A handsome Tulip, the name of which is pronounced 'Borshovi.' The medium-sized flowers with oblong lance-shaped acute segments appear in May, and attract attention by the 3 inner petals or segments being of a bright golden-yellow on both sides, while the 3 outer petals are yellow inside, but bright red outside with a distinct and narrow yellow border.

Culture &c. as above. The one drawback to this Tulip seems to be its flower stalks, which are about a foot high, but too weak—at least in the specimens I have seen—to be able to hold the flowers erect without a support.

T. chrysantha.—A distinct species, native of Persia and Western Asia, being abundant on the Brahin Hills at 5000 to 6000 ft. elevation, according to Mr. Elwes. It is related to *T. montana*, and is recognised by its smallish yellow flowers, dwarf stem, and sharply undulated leaves with cartilaginous margins. Very rare, but grown at Kew.

Culture &c. as above, p. 860.

T. clusiana.—A beautiful and distinct species, well known as the 'Lady Tulip' of Southern France. It produces numerous strong bulbs, and rose-coloured flowers, white inside, with a deep purple or violet centre, yellowish ovary, and black stamens, borne on slender stalks 8–12 in. high. The rare *T. stellata* from the N.W. Himalayas is closely related to this. It has white or pale yellow flowers without a distinct purple centre, and yellow stamens.

Culture &c. as above, p. 860.

T. dammanniana.—A new species from Mount Lebanon having linear lance-shaped leaves with hairy margins and scarlet or purple-red flowers with a black base.

Culture &c. as above, p. 860.

T. Didieri (*T. fransoniana*).—A pretty S. European species about 18 in. high, with crimson flowers, edged with yellowish-white, and having a large blue-black centre. The variety *alba* has white flowers. There are other forms, one being yellow, closely freckled and flamed with red. The perianth segments are very much tapered and sharp-pointed, and the stamens are blackish.

Culture &c. as above, p. 860.

T. Eichleri.—A Caucasian Tulip about 10 in. high, closely related to *T. Didieri*, having broad leaves and large brilliant scarlet flowers, sometimes edged with yellow, and having a black centre.

Culture &c. as above, p. 860.

T. elegans.—A Tulip of unknown origin, but supposed to be a hybrid between *T. acuminata* and *T. suaveolens*. It has beautiful bright red or carmine flowers, with a yellow centre and slightly reflexed segments tapering to a point. The form called *variegata* has dark scarlet flowers striped with yellow.

Culture &c. as above, p. 860.

T. flava.—A late-flowering Tulip of garden origin, with soft yellow flowers, the beauty of which is slightly marred by a line or stripe of green down the centre.

Culture &c. as above, p. 860.

T. gesneriana.—A splendid but variable species from which most of the garden varieties have been obtained. It is widely distributed in a wild state throughout S. Europe, from Italy to Greece, and extends to Asia Minor and probably Central Asia. It has broad ovate lance-shaped glaucous leaves and a scape 8–12 in. high, bearing in May and June a large bell-shaped sweet-scented bright scarlet flower with a black centre and 6 purple stamens. The form cultivated largely in Holland is known as *fulgens*, but has a yellow centre and yellow stamens.

The variety *spathulata* has large brilliant red flowers with a purple-black centre; and the one called *violacea* has reddish-violet flowers with a blue-black centre.

Culture &c. as above, p. 860.

T. Greigi.—This fine species from Turkestan is considered to be one of the best and most distinct in the genus. It is 9–18 in. high, with 3–4 large pale green or glaucous leaves richly covered with oblong purple-brown blotches, the upper leaves being much narrower than the lower ones. The bright fiery-red bell-shaped flowers 2–3 in. deep have broad blunt segments, each with a triangular black blotch edged with yellow at the base. The flowers are often 6 in. across, and when fully expanded are almost flat. There is a form with yellowish-red flowers and the blotches on the leaves scarcely visible, and another called *aurea* with yellow flowers and a reddish centre.

Culture &c. as above. *T. Greigi* is very hardy. The bulbs should be planted early in August or September in deep rich soil, and may be allowed to remain for several years undisturbed. They seed freely in warm favourable seasons, and will often sow themselves naturally. The seedlings, if not choked with other vegetation, may be transplanted in August or September into prepared beds, where they will have room to develop.

T. **Haageri.**—A native of Asia Minor somewhat resembling *T. Orphanidea.* It grows about 9 in. high, and has cherry-red flowers often tinged with yellow outside, and a blue-black centre bordered with yellow within.

Culture &c. as above, p. 860.

T. **kaufmanniana.** —A beautiful early Tulip 8-12 in. high from Turkestan, with glaucous leaves developed after the large bright carmine flowers edged with white are produced. The inner surface of the perianth segments is pearly white, with a bright yellow base bordered with crimson. There are a few forms or variations of this species sometimes seen, that known as *pulcherrima* being probably a hybrid between it and *T. Greigi.*

Culture &c. as above, p. 860.

T. **Kesselringi.** — A native of Turkestan with linear channelled glaucous leaves and bright yellow flowers about 2 in. deep, the 3 outer segments being suffused with reddish-brown outside.

Culture &c. as above, p. 860.

T. **kolpakowskyana.** — A pretty species also from Turkestan, with deeply channelled lance-shaped leaves about 1 ft. long, having minutely ciliated margins. The scapes are 1–2 ft. high, each bearing a large handsome flower 2–3 in. deep, variable in colour, being sometimes bright red with a black centre and purple-black stamens, sometimes yellow flushed with red outside, and sometimes pure yellow with a blackish centre and yellow anthers and filaments.

Culture &c. as above, p. 860.

T. **Korolkowi.**—This is a native of the deserts between Khiva and Tashkend and is related to *T. Eichleri*, but has smaller flowers of a dazzling red, with a black blotch at the base.

Culture &c. as above, p. 860.

T. **lanata.**—A native of Asia Minor, about 8–12 in. high, having brilliant crimson flowers, the segments of which are furnished with a woolly tip—hence the specific name.

Culture &c. as above, p. 860.

T. **Leichtlini.**—A distinct and pretty species from Kashmir, about 18 in. high, the 3 inner segments of the perianth being yellowish-white and much shorter and blunter than the outer ones, which are of a bright purple or coral-red, edged with white.

Culture &c. as above, p. 860.

T. **linifolia.**—A species from Central Asia recognised by its narrow glaucous very wavy leaves and glowing scarlet flowers with a black centre, borne on scapes 6–8 in. high.

Culture &c. as above, p. 860.

T. **macrospeila.**—A fine Tulip of unknown origin but probably a hybrid between *T. gesneriana* and some other species. It is like *gesneriana* in habit, and produces in May its large fragrant crimson flowers 3–4 in. deep, the broad bluntish segments each having a blackish wedge-shaped blotch bordered with yellowish-white at the base. The relatively short stamens are black, and the capitate stigma is very much crisped.

Culture &c. as above, p. 860.

T. **maculata.**—Another kind of garden origin, resembling *T. gesneriana*, and having bright crimson-red flowers with a black centre, borne on downy stalks.

Culture &c. as above, p. 860.

T. **Maximowiczi.**—A rare species from Bokhara, related to *T. linifolia*, and having the stems furnished with alternate linear leaves, the margins of which are red and minutely hairy. The fine purple-red flowers have a dark blotch bordered with white at the base of each perianth segment.

Culture &c. as above, p. 860.

T. **montana.**—This species is distributed in a wild state from Armenia to Afghanistan, and is remarkable for the dense wool which covers the interior of the bulb coats. It flowers very late, the blooms being of a bright carmine-red and about 2 in. deep, with a black centre. The stalk is only 6–8 in. high.

Culture &c. as above, p. 860.

T. Oculus-solis.—A distinct and beautiful Tulip from Southern France, having leaves about 1 ft. long and 1½ in. broad when fully developed. The flowers appear in April, each one on a stem 12–18 in. high. They are 2–3 in. deep, bright red, each perianth segment having a large black blotch 1 in. or more long, bordered with yellow, at the base. *T. præcox* is the form of this most generally grown. It has a stronger habit, and produces its flowers earlier, often by the end of March. They are deep crimson with a black centre. A form of *præcox* called *Dammanni* has large brilliant scarlet flowers with a pointed black blotch at the base of each segment, and seems to be very near the typical *Oculus-solis*. *T. maleolens* is similar, but the flowers are recognised by their unpleasant odour.

Culture &c. as above, p. 860.

T. Orphanidea (*T. Minervæ*).—A native of the Greek mountains with linear channelled leaves and stalks 1–2 ft. high, each bearing a bright yellow flower 2–3 in. deep, in May, the acute segments being flushed with red outside. The variety *aurantiaca* has orange-yellow flowers with a black centre.

Culture &c. as above, p. 860.

T. ostrowskyana.—A native of Turkestan closely related to *T. Oculus-solis*. It has linear lance-shaped rather glaucous leaves and bright red flowers with a black centre, the short dilated filaments and anthers being deep purple.

Culture &c. as above, p. 860.

T. persica.—A Tulip of unknown origin but presumably Persia, with deep green oblong linear leaves edged with red. The stem is 6–9 in. high, and like that of *T. biflora* bears more than one fragrant flower the inside of which is bright yellow, the outside golden-bronze, the 3 outer segments being narrower than the inner ones and also ciliated at the base.

Culture &c. as above, p. 860. A pretty plant for the edges of borders and choice spots in the rockery.

T. platystigma.—A native of the High Alps, resembling forms of *Gesneriana*, recognised by the magenta or pale purple flowers, having a pale bluish centre bordered with white.

Culture &c. as above, p. 860.

T. primulina.—A native of the Eastern Algerian mountains, and somewhat like *T. sylvestris*. It has smooth green linear leaves and sweet-scented bell-shaped primrose-yellow flowers about an inch deep, the outer segments being tinged with red outside, while the stamens are densely hairy at the base.

Culture &c. as above, p. 860.

T. pulchella.—A pretty dwarf Tulip from the Cilician Taurus, with narrow green channelled leaves about 3 in. long, and slender scapes only an inch or two high. The funnel-shaped flowers appear in April and are mauve or lilac, with a yellow base, and very hairy whitish filaments.

Culture &c. as above, p. 860.

T. retroflexa.—This is supposed to be a hybrid between *T. acuminata* and *T. gesneriana*, and is an attractive plant. It grows 1½–2 ft. high, and bears bright yellow flowers, the segments of which about 3 in. long are recurved, and gradually taper to a sharp point.

Culture &c. as above, p. 860.

T. saxatilis.—A beautiful Tulip found growing wild near the seashores of Crete. It has usually 3 leaves of a very bright shining green, unlike those of any other Tulip. The faintly primrose-scented flowers are pale magenta with a deep yellow centre, and the filaments are covered with hairs. The scape is 9–12 in. high.

Culture &c. as above, p. 860.

T. Schrenki from Turkestan grows about 2 ft. high, and has very large and full bright crimson flowers with a deep black centre, a large yellow capitate stigma and long black anthers with very short filaments. Mr. Elwes considers this to be the origin of the scarlet Duc van Thol bedding variety.

Culture &c. as above, p. 860.

T. Sprengeri.—A fine Armenian species having an egg-shaped bulb surrounded by a very hard brown-black skin, and very narrow pale green leaves arranged as in a tuft, and quite different from any other Tulip. The scapes are about 18 in. high ending in a large glowing scarlet flower the 3 outer segments of which are tinged with pale brown down the centre. The flowers appear from the middle to the end of June, long after those of other species are over, and this fact makes it an important addition to the genus.

Culture &c. as above, p. 860. It is slowly increased by offsets, but seeds also ripen well. It is found wild with the crimson and black flowered *T. armena* and a fine new Golden Tulip with green basal blotches, *T. galatica*, neither of which is yet known well.

T. suaveolens.—This is the wild form of the early red and orange (not scarlet) Duc van Thol Tulips. It is a native of the Crimea and S.E. Russia, and has broad leaves, scapes about 6 in. high, each ending in a single sweet-scented large flower, bright scarlet in colour, bordered with yellow.

Culture &c. as above, p. 860.

T. sylvestris.—This is our wild British Tulip found in chalk pits and waste ground in various parts of England. It has linear glaucous leaves 6–10 in. long, and bright yellow fragrant flowers 2 in. deep, borne in April and May on flexuous stems 1–2 ft. high. The filaments are hairy or woolly at the base.

T. biebersteiniana from S. Russia and Asia Minor may be regarded as a small-flowered form of the wild English Tulip. *T. fragrans* from Algiers resembles *T. sylvestris*, but is smaller and not so hardy. *T. strangulata* from the neighbourhood of Florence may also be regarded as a form of *T. sylvestris*, although there are red and yellow flowered forms, with a black centre.

Culture &c. as above, p. 860.

T. turkestanica. — A native of Turkestan, with broadly linear lance-shaped leaves, and white flowers about 1½ in. across, with a yellow stain or blotch at the base of each segment.

Culture &c. as above, p. 860.

T. undulatifolia.—A handsome species, native of the Bozdagh Mountains near Smyrna. It has glaucous narrow lance-shaped leaves about 6 in. long, channelled down the centre and wavy on the edges. The scapes are 6–9 in. high, each bearing a bell-shaped flower about 2 in. deep, bright crimson inside, greenish-red outside, the centre being black with a yellow border. Some forms have a yellow centre, and flatter, less wavy leaves.

Culture &c. as above, p. 860.

T. violacea.—A native of the Talysch Mountains in North Persia, resembling *T. clusiana*, but has narrower leaves, and smaller flowers of a brilliant deep carmine-red, borne on scapes about 6 in. high. It begins to bloom earlier than any other species and is from that point of view very valuable.

Culture &c. as above, p. 860.

T. viridiflora (*Green Tulip*).—A very curious but not particularly handsome garden form of *T. gesneriana*, with large greenish or greenish-yellow flowers having brighter yellow stripes and bands of yellow. The Parrot Tulips are supposed to be derived from this peculiar plant.

Culture &c. as above, p. 860.

T. vitellina. — A sturdy form of *T. gesneriana*, having ovate lance-shaped acute glaucous leaves, and large and beautiful flowers of a delicate whitish-yellow, the segments of which are bluntly ovate.

Culture &c. as above, p. 860.

ERYTHRONIUM (DOG'S TOOTH VIOLET).—A genus of pretty herbaceous plants with tunicated corms which produce new ones either at the base within the old coats or at the end of long offshoots, or along a rhizome, sometimes in succession for several years. The leaves on the stems are unequal, one being usually narrower and more tapering than the other. The mottling varies greatly even in the same species, and may sometimes be absent altogether. The flowers are nodding or drooping, solitary, or 2 or more in a loose raceme. The perianth consists of 6 distinct narrow segments, which unite into a tube at the base. They are often recurved or reflexed from the middle or near the base, and are furnished with 2 auricles or scales at the bottom. Stamens 6, hypogynous, or scarcely adnate to the base of the segments. Ovary sessile 3-celled. Styles united or separated. Capsule many-seeded.

Until a comparatively recent period the Common European Dog's Tooth Violet was the only species of Erythronium cultivated, but now most of the fifteen species known altogether are grown, although most of them are still rather scarce. With the solitary exception of the European and Asiatic *E. Dens-Canis*, they are all natives of the United States. From a flower-garden point of view they are a beautiful and hardy group, well suited for the rock garden, the edges of flower borders or shrubberies, planted in grass, and for naturalising generally in woodlands.

Culture and Propagation.—They succeed in any good light garden soil, but prefer moist light sandy loam, with the addition of a little peat and leaf soil. They usually bloom in spring; and after the leaves have withered require a period of rest. If the soil is well drained little harm will come to them during the winter months. Where they are to remain in the soil for several years, an annual top-dressing of manure or fresh soil will do them much good and stimulate the development of vigorous foliage and large flowers.

New plants are obtained by separating the offsets from the old corms or from the creeping rootstocks, as the case may be. The best time for disturbing the plants is after the foliage has withered. The corms may be planted about 3-4 in. deep, and to obtain good effects several should be placed so as to form a large mass when in bloom.

Besides outdoor cultivation Dog's Tooth Violets are also excellent subjects for growing in pots. Indeed rare species are probably best grown in this way in cold frames or cold well-aired greenhouses until the stock is numerous.

The following species are at present known. The descriptions, with certain additions and emendations, are the same as those I contributed in an article to the 'Gardeners' Chronicle,' September 26, 1896, p. 361, with a drawing of *E. Hartwegi*. They are based mainly upon the late Sereno Watson's revision of the genus in the 'Proceedings of the American Academy of Arts and Sciences,' and through the kindness of Messrs. Wallace & Co. of Colchester, I have been able to see many of them in flower.

E. albidum.—A native of the wet pastures of New York, Pennsylvania &c., with ovoid stolon-bearing corms, and oblong lance-shaped usually slightly mottled leaves. The flowers appear in April and May, one on a stalk, and are of a white or bluish-white colour tinged with yellow at the base, the lance-shaped segments 1-1½ in. long being strongly reflexed, and not all auricled at the base. *E. bracteatum* is considered to be a closely related form. It has somewhat larger leaves, and differs, moreover, in having yellow flowers. It also inhabits the mountain regions instead of the pastures. The variety *coloratum* has deeper coloured flowers than the type.

Culture &c. as above.

E. americanum.—This species grows in the damp open woodland of the Eastern United States and Canada. It has ovoid stolon-bearing corms like *E. albidum*, and larger leaves mottled with greenish-purple. The solitary flowers appear in April and May, and are of a bright golden-yellow often tinged with purple, and finely dotted within at the base. Sometimes called 'Yellow Adder's Tongue.'

Culture &c. as above.

E. citrinum.—A native of the Deer Creek Mountains in S. Oregon, usually bearing 3 lemon-yellow flowers on a stalk, the broadly lance-shaped segments about 1 in. long being strongly recurved, orange at the base, and sometimes suffused with pink at the tips.

Culture &c. as above.

E. Dens-Canis.—This is the Common Dog's Tooth Violet, found wild chiefly in Central and S. Europe, although forms of it extend across Asia to Japan. It has ovoid cylindrical corms resembling a dog's tooth, and ovate or oblong lance-shaped glaucous-green leaves marbled with dull purple. The peduncle 4-6 in. high bears a solitary flower of a beautiful rose or violet-purple (rarely white), with brown dots at the base of the recurved segments. Besides the rare white form, there are others called *purpureum*, *roseum*, and *violaceum*, according to the shades of colour. The Siberian form, *sibiricum*, has purple flowers, and is a more vigorous plant than the type, while the Japanese form, *japonicum*, has violet-purple flowers.

Culture &c. as above.

E. giganteum.—This has been confused with *grandiflorum*, and has been called *grandiflorum* and *giganteum albiflorum*, also *maximum* and *speciosum*. It is found at an elevation of 6000 to 10,000 ft. in California, and is one of the finest and most showy species. The leaves are mottled with dull purple, and the large creamy white flowers 3 in. across are suffused with orange or yellow at the base, and from 1 to 6 are borne on a tall scape.

Culture &c. as above.

E. grandiflorum. — A pretty species 3–6 in. high, native of the mountains of Idaho, Washington &c., with erect oblanceolate unmottled leaves, and golden-yellow flowers about 3 in. across with crimson stamens, borne in March and April, usually 2 on a stem. This plant was formerly known as *E. grandiflorum minus*, and is figured as such in the 'Botanical Register,' t. 1786.

The variety *parviflorum* is the same as the plant grown as *nuttallianum* (true plants of which do not yet appear to be in cultivation), and being more common than the type has usually been called *grandiflorum*. It is a native of the Blue Mountains of Oregon, and the Cascade Mountains of Washington, besides Colorado, Utah &c. It first flowered in England about 1885 or 1886. The form called *Murrayi* seems to be rare, and is said to have mottled leaves.

Culture &c. as above, p. 870.

E. Hartwegi. — A fine Californian species with small corms and broad green leaves distinctly marbled with dull purple. The large creamy white flowers with an orange base are 2½–3 in. across. They appear in March and April, and remain in good condition for three or four weeks. As a rule only one nodding flower is borne on a scape 4–8 in. high, but in a wild state sometimes as many as three are on the same stalk. When first introduced it was called *E. grandiflorum*.

Culture &c. as above, p. 870.

E. Hendersoni.—A pretty and distinct species 4–6 in. high, native of the mountains of S. Oregon. It has oblong tunicated corms and dull green oblong lance-shaped leaves faintly mottled with purple-brown. From one to three drooping flowers are borne on a purple-rose scape in March and April. The segments are curled back to the stalk, and are pale rose with deeper purple in the centre with a yellow zone. The conspicuous stamens are deep purple-brown, and the stigma deep crimson.

Culture &c. as above, p. 870.

E. Howelli.—A pretty species from the same region as *E. Hendersoni*, which it resembles in habit and foliage. The flowers with recurved segments, however, are pale yellow with a deep orange base, becoming pinkish with age.

Culture &c. as above, p. 870.

E. Johnstoni. — A new species with large clear rosy-pink flowers, having a rich yellow zone at the base.

Culture &c. as above, p. 870.

E. mesochoreum. — A native of the grassy prairies and wooded slopes from Iowa to Kansas. It resembles *E. albidum*, but has unmottled and narrower leaves, and the segments of the whitish flowers are not recurved. This species is not yet in cultivation, but as it is almost sure to be shortly, it is included here.

Culture &c. as above, p. 870.

E. montanum.—A native of the Oregon and Washington mountains, having 1–2 large creamy white flowers on a stalk, the base of the segments being orange, often fading to pink. This flowers later than the other species, from July to September.

Culture &c. as above, p. 870.

E. propullans.—A native of Minnesota, having small ovoid stolon-bearing corms, and oblong lance-shaped slightly mottled leaves 2–4 in. long. The peduncle is only 2–3 in. high, bearing a solitary rose-purple flower with a yellow centre.

Culture &c. as above, p. 870.

E. purpurascens. — A Californian species with corms 1–2 in. long, and large wavy leaves. This species bears more flowers than any other, sometimes as many as eight on a single stem. They are pale yellow tinged with purple, and deep orange at the base of the segments.

The variety *multiflorum* has mottled leaves, and is said to bear as many as 15 bright lilac flowers with a yellow centre on a single stalk.

Culture &c. as above, p. 870.

E. revolutum. — A beautiful species, native of Nootka Sound, where it was first discovered over 100 years ago, but has only recently been introduced to cultivation. The true species has large dark green leaves mottled with brown, and 1–2 flowers are borne on tall stout scapes in spring, and vary in colour from pink to deep rosy-purple. The variety *Bolanderi* (or *Smithi*) has 1–3 flowers on a stalk, white with a yellowish centre, becoming rosy-purple.

Culture &c. as above, p. 870.

GAGEA. — A genus of herbaceous plants, having small bulbs, with radical linear leaves, and flowers in racemes or clustered umbels at the top of a scape.

The perianth has 6 distinct spreading 3–5-nerved segments, and 6 stamens attached at the base, or almost hypogynous.

G. lutea (*Ornithogalum luteum*).—This is the only species out of about 20 of any garden value. It is known as the 'Yellow Star of Bethlehem,' and is a native of British copses and pastures. It has small roundish bulbs, and linear leaves 6–18 in. long. The yellow flowers, keeled with green, appear from March to May, 3–4 in a flat raceme on a slender scape scarcely 6 in. high.

Culture and Propagation.—This species grows in ordinary garden soil, and is readily increased by the numerous offsets from the old bulbs, after the foliage has withered.

LLOYDIA.—A genus consisting of only one species:—

L. alpina (*L. serotina*).—A pretty little plant, native of the Alps and the rocky ledges of the Snowdon range. It has a small thickly scaly bulb and slender half-roundish leaves 6–10 in. long, and white or yellow flowers veined with green or purple outside, borne in June.

Culture and Propagation.—In structure it is closely related to Gagea. It is essentially a rock plant, and thrives in cool partially shaded positions in ordinary soil, and may be increased by means of offsets from the old bulbs in autumn.

CALOCHORTUS (Mariposa Lily; Star Tulip).—A genus of beautiful plants with tunicated bulbs, narrow leaves, and somewhat branched few-flowered stems, bearing long-stalked, showy, erect or drooping flowers, yellow, bluish-purple, or white in colour. The perianth consists of 6 distinct segments, the 3 outer ones of which are sepal-like, and much narrower than the 3 larger and broader inner ones which are bearded on the inside. In the Cyclobothras or 'Star Tulips,' which are now included with the Calochorti or 'Mariposa Lilies' proper, all the perianth segments are bearded within and furnished with a honey-pit in the centre. Stamens 6, hypogynous, or slightly adhering to the base of the segments. Capsule 3-celled, 3-angled, with many seeds.

Culture and Propagation.—These beautiful plants, of which there are 20 or 30 species, have attracted a good deal of attention in the past few years, as it has been proved that with a little care they can be grown very satisfactorily out of doors. They are usually cultivated in pots or cold frames so as to be more readily protected from frost, and kept dry during the resting period. Being mostly natives of the warm sunny climes of California, Oregon, Arizona &c., and parts of Mexico, they require a warm sunny position and a light thoroughly well-drained soil. In the British Islands, indeed, the chief trouble in their culture seems to be inability to thoroughly ripen the bulbs after flowering. This is very often due to the neglect of not keeping the rain from them after the foliage has withered. If treated in the same way as recommended for the Oncocyclus Irises (p. 918) good results will follow, and the plants are worth a little trouble on account of their lovely and unique flowers.

Messrs. Wallace of Colchester, who have done much to popularise these plants and who have been very successful in growing them in our variable climate, may be quoted as authorities on their culture. They recommend that the bulbs should be planted from September to the end of November, but not later, 3 in. deep and about 3 in. apart, in a raised sunny border with a slight slope to the south. A soil composed of sharp sand, leaf soil, and road grit is the best. Great importance is attached to having the bed in which they are planted raised above the surrounding soil, as thorough drainage is thus secured, and it is essential to keep the bulbs as dry as possible in winter. It is safer, especially in unfavourable parts of the kingdom, to cover the beds with reeds, bracken, straw &c., so as to keep off heavy rains, and at the same time afford protection from frost. This covering, whatever it is, should be removed in February and March, according to the season and the growth of the plants. After flowering, and when the stems have withered, either the bulbs may be lifted and carefully stored until planting time, or a light may be placed over them to keep them dry, and allow them to thoroughly ripen. The latter is the better plan if it can be adopted, and there is no necessity to lift the bulbs for about 3 years unless for the purpose of increasing the plants by means of the offsets from them.

The main points to remember in growing Mariposa Lilies are early planting, a light porous soil, sunny position, thorough drainage, protection from winter rains, plenty of water during active growth, and thorough ripening of the bulbs by lifting, or placing lights over them.

Besides offsets from the old bulbs, Mariposa Lilies may also be increased by seeds, or the small bulbils often produced on the upper portion of the stems, as in the case of some Lilies. The seeds may be sown as soon as ripe or early in spring in cold frames, or under glass in pans, but so thinly as to allow the seedlings plenty of space to develop without disturbing for one or two years. They may then be planted in light soil either in frames or singly in pots, and grown on until they reach the flowering stage, which is in 3–6 years after the seed is sown.

The following are the best known species in cultivation. Except where otherwise stated, they are all natives of California. As all the flowers are more or less fringed with hairs inside it is unnecessary to refer to the fact in every description.

C. albus (*Cyclobothra alba*).—A handsome and vigorous species 12–18 in. high, bearing 8–12 roundish drooping flowers of pearly white, fringed with silk hairs inside and having a deep blotch at the base of the segments.

Culture &c. as above. This species may be grown in the ordinary flower border in light sandy soil in warm places. It is readily increased by offsets, and will produce flowering plants from seeds in about 3 years.

C. apiculatus.—A vigorous Star Tulip with stout stems 9–18 in. high, bearing pale lemon-yellow flowers, which become more creamy in colour in the smaller-flowered form known as *minor*.

Culture &c. as above.

C. Benthami (*C. elegans lutea*).—A beautiful species 4–8 in. high, with long linear leaves, and bright yellow flowers produced in July and August 3–6 on a stem, the inner surface being densely covered with yellow hairs.

Culture &c. as above.

C. cæruleus.—A dwarf Star Tulip from Sierra Nevada growing 3–6 in. high, and producing a solitary linear leaf. The pretty flowers appear in July 3–5 in an umbel. They are of a bright lilac or creamy white densely bearded with bluish hairs, the outer segments being lined and dotted with dark blue The variety *major* is a very large-flowered form, and *roseus* has a distinct rosy hue.

Culture &c. as above.

C. clavatus.—A fine vigorous Mariposa Lily having a much-branched stem bearing large wide open flowers of a brilliant golden-yellow during June and July.

Culture &c. as above.

C. collinus.—A new and still very rare species with clear pale lilac flowers, opening wide.

Culture &c. as above.

C. elegans.—An elegant species about 8 in. high, producing in June 3–5 greenish-white flowers tinged with purple at the base, the 3 inner segments being only slightly or not at all bearded on the margin. The variety *amœnus* is a beautiful free-flowering form with nodding flowers of a rich pink colour, the 3 broad inner segments having a deep zone near the base, the whole surface being covered with silky hairs.

Culture &c. as above.

C. flavus.—A Mexican species having lance-shaped taper-pointed leaves and drooping yellow flowers, the 3 inner segments of which curve outwards, and are covered with hairs except near the tips. It requires protection in winter.

Culture &c. as above.

C. Greeni.—A vigorous species 1 ft. or more high, having broad glaucous-green leaves, and bearing in June 3–5 large clear lilac flowers on a stem, the inner segments of which are zoned with yellow and purple at the base, and often covered with long curly hairs.

Culture &c. as above.

C. Gunnisoni.—A native of the Rocky Mountains, with large bright lilac flowers 2–3 in. across, tinged with yellowish-green below the middle of the segments, at the base of which is a deep purple zone.

Culture &c. as above.

C. Howelli.—A strong-growing species 9–18 in. high, with a long glossy leaf, and large creamy-white flowers.

Culture &c. as above.

C. Kennedyi.—This is one of the most striking and beautiful species known. It grows about 18 in. high, and freely produces its large bright orange-red flowers in early summer.

Culture &c. as above.

C. lilacinus (*C. umbellatus*).—A distinct species, one bulb of which will often throw up a dozen spikes or more of bloom each having a narrow lance-shaped leaf. From 4 to 10 flowers of a pale pink, purple or lilac are borne on a stem 6–8 in. high, the lower portion of the segments being hairy.

Culture &c. as above.

C. longibarbatus.—A distinct species about 1 ft. high, native of Oregon and Washington Territory. The flowers appear in July, 1–3 on a stem, and are of a pale purple-lilac with a darker purple band across the base of each inner segment and a long beard above it.

Culture &c. as above.

C. luteus.—A beautiful Mariposa Lily 1–2 ft. high, with slender stems bearing 1–6 erect cup-shaped flowers about 3 in. across. They vary in colour from light to deep yellow and orange, the inner segments being usually bordered with purple hairs, and tinged with reddish-brown at the base, the outer ones being greener in colour. In the variety *oculatus*, which has bright yellow flowers, there is a conspicuous dark purple eye-like blotch at the base of the inner segments. The variety *citrinus* with rich lemon-yellow flowers is regarded by some as a form of this, but is more properly related to *C. venustus*. The variety *concolor* grows vigorously, and produces open flowers of a clear bright yellow, slightly tinged with brown at the base. The flowers of this group usually appear in July.

Culture &c. as above.

C. Lyoni.—A handsome free-flowering species which produces its large blossoms, varying from pure white to rose, early in June, the inner segments having a large blackish spot at the base.

Culture &c. as above.

C. macrocarpus.—A fine species having stiff stems 1½–2 ft. high, bearing flowers about 4 in. across in July, usually one on a stem. They are delicately tinted with purple-lilac, becoming paler towards the base, and having a greenish line down the centre of the segments.

Culture &c. as above.

C. madrensis.—This is a pretty Mexican species rarely exceeding 18 inches in height, and produces several of its bright orange-yellow flowers with a tuft of deeper orange hairs at the base of each segment later than most other species in August and September. It does not go to rest so early in consequence.

Culture &c. as above.

C. maweanus.—A beautiful Star Tulip 6–10 in. high, with linear glaucous leaves. The bell- or cup-shaped flowers appear in June and July 4–6 on a stem, each about 2 in. across. The broadly obovate-acute outer segments are purplish, and the three inner segments are pure white, tinged with purple at the base, and densely covered with long purple hairs.

Culture &c. as above.

C. nitidus.—This is a strong-growing species, the stems of which bear 5–10 large white flowers in an umbel. The three inner segments have a large indigo blotch in the centre, and the surface is covered with long hairs.

Culture &c. as above.

C. Nuttalli.—A distinct species having large flowers about 3 in. across, the three narrow outer segments of which are green striped with red, while the three larger inner segments or petals are pure or creamy-white, with a blackish-purple blotch at the base. There is an improved variety known as *Leichtlini*. The flowers appear in June 2–3 on a stem.

Culture &c. as above.

C. obispoensis.—A species with sparingly branched stems 1–2 ft. high, and narrow acute convolute leaves. The 3 outer segments are orange and purple on a greenish-yellow ground, the shorter inner ones being lemon-yellow tipped with reddish-brown and covered with long delicate hairs.

Culture &c. as above. This species does not appear to be in cultivation yet.

C. Palmeri.—A small and very rare species with bright lilac flowers.

Culture &c. as above.

C. Plummeræ.—A very fine species remarkable for its broad radical leaves nearly 2 ft. long, and strong branching flower-spikes which appear in July, bearing numerous soft lilac flowers about 4 in. across, of a satiny lustre, the lower half of each inner segment being covered with golden-yellow hairs, and blotched with purple, the three outer segments being relatively very narrow and tapering.

Culture &c. as above.

C. pulchellus (*Cyclobothra pulchella*). A charming species 9–12 in. high, with glaucous stems and leaves, producing in June and July much-branched stems, each one ending in a cluster of 3–4 sweet-scented bright orange-yellow drooping flowers.

Culture &c. as above. This is one of the hardiest species, and flourishes in the ordinary flower border or rockery in light well-drained soil, and blooms regularly every year without protection in winter. Warm sunny spots are best for ripening the bulbs.

C. Purdyi.—A graceful species which starts rather late into growth, and throws up a stem 9–18 inches high, bearing in June 4–9 white flowers 1½–2 in. across. The narrow pointed outer segments are spotted with purple, the much larger and roundish inner segments being densely covered with long white hairs, and blotched and spotted with purple near the base.

Culture &c. as above. It grows naturally in a cold damp climate, and will probably prove one of the best species in British gardens.

C. splendens.—This is a very old garden plant, and is still one of the best. It freely produces its large pale lilac flowers in August, the inner segments being covered with long silky white hairs, and blotched with deep purple at the base. The variety *atroviolacea* has smaller purple flowers with a dark red blotch at the base of each inner segment.

Culture &c. as above.

C. Tolmiei.—A strong-growing Star Tulip, but unfortunately rather rare. It has rather tubular flowers covered with bluish hairs.

Culture &c. as above.

C. venustus.—A beautiful Mariposa Lily growing about 18 in. high, and producing large white cup-shaped flowers nearly 3 in. across. The three outer segments are small, narrow and tapering, and become reflexed, the three large inner ones being yellow at the base, deeply stained with crimson, and having a blotch of the same colour near the centre, below which the surface is covered with hairs.

This is a very variable species, and numerous varieties exist. The principal are *albus*, pure white; *brachysepalus*, having shorter outer segments or sepals than the type; *lilacinus*, deep lilac; *purpurascens*, deep lilac-purple; *roseus*, rosy-purple with deep purple spots; *Emperor*, flowers suffused with rose, white, maroon, and purple on a yellow ground; *citrinus*, lemon-yellow; *oculatus*, with brilliant purple-rose buds expanding into white, having a deep blackish-purple centre surrounded with yellow; *sanguineus*, flowers varying from light to deep red; *Vesta*, with flowers 4 in. across, white flushed with rose, marked with brown and yellow at the base. This variety will grow in any soil, from heavy wet clay to light loam, and increases rapidly.

Culture &c. as above.

C. Weedi.—A beautiful and remarkable species closely related to *C. luteus*. It produces its large flattish rich yellow flowers 3 in. across in July. The three outer segments of the perianth are narrow, lance-shaped, and tapering, while the three broad inner wedge-shaped segments are spotted with purple in the central portion and covered with long hairs. The short filaments, with long anthers, are a striking feature of the centre of the flowers.

Culture &c. as above.

COLCHICUM (Meadow Saffron). A genus of beautiful plants having tunicated corms, oblong strap-shaped or linear radical leaves, and short scapes bearing 1–3 or more showy lilac or rarely yellow flowers. The perianth is funnel-shaped with a long slender tube, and 6 oblong erect or somewhat spreading segments. Stamens 6, attached to the base of the segments and shorter than them. Ovary sessile 3-celled, at first underground but ultimately produced above ground by the growing leaves. Styles 3, thread-like. Capsule ovoid, 3-ribbed, many-seeded.

Culture and Propagation.—Colchicums flourish in a light rich sandy soil with a certain amount of moisture in it. The best time for planting is about August, certainly not later, as the corms are apt to lose a good deal of their vitality. About 3–4 in. deep is sufficient, and 6–9 in. apart.

Colchicums are lovely autumn-flowering plants, and as the popular name indicates are excellent when planted in grass land. They are also suitable for the flower border, margins of shrubberies or rockeries, which they render bright when most of the summer flowers are over. To obtain fine effects broad patches should be planted, especially in grassy slopes, lawns &c.

Propagation is usually effected by separating the offsets from the corms. These may be lifted about July for the purpose, but not before the leaves have withered. Seeds may also be sown as soon as ripe in pairs and wintered in a cold frame, and as it is undesirable to move the seedlings for 2 years, sufficient space should be given to allow the seedlings to develop properly. The seedlings may be transferred to a prepared spot in the open border after this, and allowed to remain until they reach the flowering stage, usually 3-5 years after sowing the seeds.

C. autumnale.—This is the best known species and is often met with in a wild state in meadows in various parts of the British Islands. It has large egg-shaped corms with shining chestnut-brown scales and flat lance-shaped leaves 6-10 in. long produced in spring. The bright purple flowers appear in succession from August to October or November, having a cup-shaped perianth with a long slender tube. There are numerous varieties, such as *album*, white; *album fl. pl.*, white, with double flowers; there is also a double rose form; *maximum*, purple; *purpureum*, purple rose; *striatum*, red striped with white.

Culture &c. as above.

C. Bivonæ.—A native of S. Europe, with linear grooved leaves produced in spring, and flowers in autumn prettily chequered with white and purple.

Culture &c. as above.

C. byzantinum.—A native of the Levant, having large roundish depressed corms often producing in autumn 12–15 pale rose flowers larger than those of *C. autumnale.* The leaves appear in spring and are broad, wavy, and plaited. There is a form with finely variegated foliage.

Culture &c. as above.

C. montanum (*C. bulbocodioides*).—A native of the Mediterranean region with short narrow lance-shaped or linear sickle-like leaves appearing almost with the lilac-purple or whitish flowers in February and March. This species must not be confounded with another sometimes called *montanum* but properly *alpinum*, which produces its deep rosy bell-shaped flowers in September and October, and its leaves in February and March.

Culture &c. as above.

C. Parkinsoni.—A very beautiful and distinct species from Asia Minor and the Greek Archipelago. It has ovate lance-shaped wavy leaves produced in spring, and its fine starry flowers 2 in. across appear in autumn. The white broadly lance-shaped segments are distinctly veined and beautifully chequered and barred with violet-purple.

Culture &c. as above.

C. Sibthorpi.—A rather rare species from the Levant, but one of the finest and largest. The flowers appear in September and October and are of a beautiful lilac colour, handsomely chequered with deep purple, and standing erect on stout tubes about 8 in. high.

Culture &c. as above.

C. speciosum.—A very distinct and handsome species from the Caucasus, remarkable for its great size. The broad elliptic sheathing leaves borne alternately on the stem are about 1 ft. long and 2–4 in. broad, appearing in spring, throwing the seed-capsule nearly 1 ft. above the ground. The flowers appear in September and October, having oval segments of a clear reddish or rosy purple varying to deep crimson-purple, with a white throat at the top of a very long tube.

Culture &c. as above.

C. umbrosum (*C. arenarium umbrosum*).—A Crimean species with fleshy lance-shaped leaves in spring, and rather small violet-purple flowers with long tubes in autumn.

Culture &c. as above.

C. variegatum (*C. Agrippinum; C. chionense*).—A pretty species from S.E. Europe, Asia Minor &c., having large egg-shaped corms and long narrow wavy leaves in spring. The rosy flowers appear from the end of August to October, having the lance-shaped acute segments beautifully chequered with purple-violet.

Culture &c. as above.

Other kinds of Meadow Saffron occasionally seen are *crociflorum*, with purple flowers in spring; *luteum*, a rare Central Asian species remarkable for its rich orange flowers in spring; *neapolitanum*, from Italy, with deep purple flowers; and *persicum*, from Persia, with very large rosy flowers.

BULBOCODIUM.—This genus consists of a solitary species resembling a Crocus in habit and appearance, but differing in having a superior ovary and 6 stamens.

B. vernum. — A pretty plant 4–6 in. high, with a black corm, native of the European Alps. The violet or rosy-purple funnel-shaped flowers with a long tube are produced early in spring, often as early as January in mild seasons, before the broad strap-shaped channelled leaves.

Culture and Propagation.—Owing to its early-flowering character this species is suitable for growing with Snowdrops, Leucojums, Winter Aconites, and some of the Colchicums &c. in the rockery or warm parts of the flower border. A light rich sandy loam suits it best, and the bulbs are best left alone for 3 or 4 years after planting. When new plants are required the bulbs may be lifted from July to September, and the offsets detached and replanted at once 4–6 in. apart, and 3–4 in. deep. There is a form with variegated leaves, and also one from the Caucasus called *versicolor*.

MERENDERA. — A small genus closely related to Colchicum and Bulbocodium, having tunicated corms, linear radical leaves, and 1–3 Colchicum-like flowers on a scape. The funnel-shaped perianth has 6 distinct segments, the claws of which are united into a long slender tube. Stamens 6. Ovary sessile. Styles 3. Capsule 3- furrowed or lobed, many-seeded.

Culture and Propagation. — These plants flourish under the same conditions as the Colchicums, and may be increased in the same way by offsets and seeds. They like a light rich sandy soil in rather damp situations, although when at rest as little moisture as possible at the root is advisable.

M. Bulbocodium. — This pretty plant from the Pyrenees bears a close resemblance to *Bulbocodium vernum*, but produces its rosy-lilac flowers in autumn instead of spring, and for this reason has been called *Bulbocodium autumnale*. The plant is only 3–4 in. high, its linear channelled and sickle-shaped leaves appearing after the flowers, and remaining fresh and green during the winter months. The variety *bulbocodioides* is the same as the plant described at p. 876 under the name of *Colchicum montanum*. Other species are *M. caucasica* (also known as *Bulbocodium trigynum*). It is a native of the Caucasus and produces its delicate rosy flowers in April and May. *M. persica* (*M. Aitchisoni*) from Persia &c. has pale lilac sweet-scented flowers keeled with pale red, during October and November.

Culture &c. as above.

NARTHECIUM (BOG ASPHODEL). A small genus of rigid herbs with creeping rootstocks and racemes of golden-yellow rotate flowers, consisting of 6 distinct spreading segments. Stamens 6, of which 3 are hypogynous and 3 on the base of the segments, having hairy filaments. Capsule 3-sided, narrow-pointed, many-seeded.

N. ossifragum.—A British plant with long slender wiry rootstocks and stiff strongly ribbed, taper-pointed leaves 6–12 in. long, resembling an Iris. The golden-yellow flowers about ½ in. across appear in July and August, the linear oblong segments being ribbed and green behind, the hairy filaments being white with orange-yellow anthers.

Culture and Propagation.—This is not a particularly handsome plant seen in solitary specimens, but if planted in masses in wet peaty or spongy soil near the edges of ponds, lakes &c. it is more attractive. This plant is widely distributed throughout the N. temperate hemisphere, and a smaller N. American form is sometimes met with. It may be increased by division of the rootstocks.

CHAMÆLIRIUM.—A genus with only one species here described:—

C. carolinianum.—An attractive herbaceous perennial 9–12 in. high, native of N. America. It has thickish knotty rhizomes and tufts of radical stalked bright green leaves, oblong elliptic in shape. The small pure white flowers are borne in dense cylindrical racemes in June, and with the advance of age the main flower stem changes from green to an almost pure white colour. The flowers are diœcious—that is, male and female blossoms are borne on separate plants. The perianth segments are linear and distinct, and there are 6 stamens in the male flowers, but only antherless staminodes in the female ones. Ovary 3-celled with three distinct styles.

Culture and Propagation. — This pretty little plant flourishes in damp and shady places, and looks effective in the rock garden when grown in bold masses. It may be increased by seeds sown as soon as ripe in cold frames, and also by carefully dividing the rootstocks in spring as growth is commencing.

CHIONOGRAPHIS.—A genus with only one species:—

C. japonica.—A remarkable and pretty herbaceous perennial 6–12 in. high, native of Japan. It has a short thick rootstock and tufts of narrow lance-shaped leaves, which are smaller on the stem. The small pure white flowers are borne in spring in a spiked raceme 4–5 in. long, and consist of 2 rows of 2, 3, and 4, or 6, linear segments, the lower ones being very small or wanting. Stamens 6, on the base of the segments.

Culture and Propagation. — This plant is very little known but is cultivated at Kew. It succeeds in a compost of sandy loam and peat, and is suitable for warm corners of the rock garden planted in masses. It may be increased in September by dividing the rootstocks, or sowing the seeds in cold frames as soon as ripe.

XEROPHYLLUM (Turkey's Beard).—A small genus of herbaceous perennials with short, thick, woody rootstocks, tall simple stems, and radical or clustered linear stiffish grassy leaves, with rough edges. Flowers numerous in dense pyramidal spikes. Segments 6, distinct, spreading. Stamens 6, hypogynous, longer than the oblong lance-shaped segments.

X. asphodeloides (*X. setifolium; Helonias asphodeloides*). — A handsome N. American perennial with dense rosettes of dry stiffish awl-shaped or grassy leaves 12–18 in. long. The white spreading flowers appear in May and are borne in dense racemes 4–6 in. long, on a stem 1–4 ft. high.

Culture and Propagation. — This is probably the only species in the genus, but American botanists recognise two or three. It grows best in sandy peaty soil in shaded or partially shaded places, and may be increased by dividing the roots in autumn. The variety *tenax* is simply a larger form, the broader leaves being often 2–3 ft. long, and the flower spikes 2–5 ft. high. In favourable seasons seed is ripened, and may be sown as soon as gathered in sandy peat in pans if it is desired to increase the plants.

HELONIOPSIS.—A small genus of herbaceous perennials with short rootstocks, radical, stalked, oblong or lance-shaped leaves, and somewhat nodding flowers at the end of a scape. Perianth segments narrow, distinct or slightly united at the base. Stamens 6, ovary sessile, more or less 3-lobed.

H. japonica (*H. umbellata*).—A curious little Japanese perennial very much resembling *Helonias bullata* in appearance. It has tufts of lance-shaped abruptly mucronate leaves, light green at the base and brownish towards the tips. The deep rosy flowers appear in March and April, 2–3 on a stalk, the filaments being tipped with deep blue anthers, and the style protruding about ½ in.

Culture and Propagation. — This is the only species out of 3 or 4 known that appears to be in cultivation. It flourishes in moist sandy peat, loam, and leaf soil, and likes plenty of sunshine and air in open but sheltered parts of the rockery. It may be easily increased by division of the roots late in summer, or by seeds sown in cold frames when ripe.

HELONIAS (Stud Flower). — A genus with only one species:—

H. bullata.—A beautiful N. American perennial 1–1½ ft. high, with a short tuberous rootstock, and oblong lance-shaped radical leaves contracted into a short stalk. The small purple-rose flowers appear from May to July, and are borne in dense cylindrical or oblong racemes. The 6 spreading segments are distinct or slightly united at the base, and faintly 3-nerved, while there are 6 usually hypogynous stamens, the slaty-blue anthers of which are very conspicuous. The deeply 3-lobed capsule has many seeds. The variety *latifolia* has leaves broader than in the type.

Culture and Propagation. — This plant may be grown in boggy soil or wet ground near ponds or lakes, but will also succeed in sandy loam, peat and leaf soil in a moist shaded part of the flower garden. It may be increased by seeds sown as soon as ripe, or by carefully dividing the rootstocks, but it is safer not to disturb the plants until they have made good strong clumps.

UVULARIA (BELL WORT).—A small genus of herbaceous perennials having a thickish creeping rootstock, and alternate stalkless or perfoliate ovate or lance-shaped leaves, and solitary or twin flowers at the ends of the leafy branches. The bell-shaped perianth has 6 distinct segments, erect or spreading at the tips, the outer ones having a hollow near the base inside. Stamens 6, usually hypogynous.

Culture and Propagation.—The Bell Worts, which are all natives of N. America, flourish in a peaty soil and are graceful plants in the flower border or rockery. They may be increased by dividing the rootstocks in autumn, and also by seeds sown as soon as ripe in cold frames, the seedlings being grown on for a year or so under protection until large enough for the open air.

U. grandiflora.—This is the best for garden purposes. It grows 1–2 ft. high, having smooth perfoliate oblong leaves 2–4 in. long, and pale yellow bell-shaped flowers produced in spring and early summer, drooping gracefully from the ends of the stems, and opening before the leaves are fully developed.

Culture &c. as above.

U. perfoliata.—This is similar in appearance to *U. grandiflora*, but has longer perfoliate leaves, and rather smaller drooping flowers produced at the end of forked stems. *U. puberula* and *U. sessilifolia* are both species with sessile (not perfoliate) leaves, but otherwise similar.

Culture &c. as above.

TRICYRTIS.—A small genus of perennial plants with short creeping rootstocks and tall erect stems clothed with alternate ovate or oblong leaves, contracted, nearly sessile, or heart-shaped stem-clasping at the base. The flowers are terminal and axillary, having a bell-shaped perianth of 6 distinct lance-shaped segments, the 3 outer ones of which are saccate at the base. Stamens 6, hypogynous, the filaments uniting into a tube around the ovary. Capsule 3-celled and triangular, with many seeds.

Culture and Propagation.—The species described below are ornamental and very distinct plants, and succeed in warm sheltered parts of the garden in sandy loam and peat. They flower in autumn, and the blossoms are sometimes spoiled by early frosts, but otherwise the plants are quite hardy and well worth cultivation. In bleak parts of the country they may be grown in a cold greenhouse. The plants may be increased by careful division of the rootstocks, also by seeds when obtainable.

T. hirta (*Uvularia hirta*).—*Japanese Toad Lily.*—A handsome and interesting Japanese perennial with stems 1–3 ft. high, clothed with soft white hairs, and furnished with alternate oblong sharply lance-shaped leaves 4–6 in. long, clasping the stem at the base, and arranged almost in 2 opposite rows. Several flowers on each stem appear from August to October, the white lance-shaped petals being beautifully decorated with violet or purple spots. The variety ***nigra*** has velvety black blotches on the flowers, which are as a rule produced two or three weeks earlier than those of the type, and consequently often escape the frosts which sometimes overtake the latter. There is a form with variegated leaves.

Culture &c. as above.

T. macropoda.—A native of China and Japan 2–3 ft. high, with sessile or shortly stalked oblong acute leaves 4–5 in. long, smooth above, downy beneath. The yellowish or whitish-purple flowers appear in autumn and are covered with blackish-purple spots.

Culture &c. as above.

T. pilosa (*T. elegans*).—A native of the Himalayas with hairy stems 2–4 ft. high, and oblong, slightly hairy, stem-clasping leaves 4–6 in. long. The white flowers are marked with large deep purple spots.

Culture &c. as above.

CLINTONIA.—A genus containing about 6 species of pretty little herbaceous perennials, with more or less creeping rootstocks, obovate oblong or broadly lance-shaped leaves, and small flowers with distinct narrow petals. Stamens 6, ovary sessile 3-celled. Fruit a roundish or ovoid oblong indehiscent berry.

It may be mentioned here that the plants best known in gardens under the name of *Clintonia* properly belong to the genus *Downingia*, which see, p. 555.

C. andrewsiana.—A pretty Californian perennial 12–18 in. high, with broadly oblong or lance-shaped pointed leaves, and deep rosy bell-shaped flowers borne in May and June in umbels at the end of the scape.

Culture and Propagation. — This species and the others flourish in damp and shady places in sandy peat, and may be grown in sheltered nooks of the rock garden in bold masses for effect. The easiest way to increase them is by dividing the roots in spring as growth is commencing, or early in autumn. Seeds if obtainable may also be sown in cold frames.

C. umbellata.—A pretty little North American plant 6–12 in. high, with deep green Lily of the Valley-like leaves, and rounded umbels of white starry flowers with protruding stamens produced in May and June.
Culture &c. as above.

C. uniflora.—A distinct N. American perennial about 6 in. high, with lance-shaped acute leaves and white flowers, the latter usually being solitary, rarely in pairs, and borne in July.
Culture &c. as above.

TRILLIUM (American Wood Lily). A genus of dwarf herbaceous perennials with short thick descending or horizontal rootstocks, and remarkable for having its leaves and flowers arranged in threes. The three broad almost sessile or long-stalked leaves are whorled on top of the stems, and are 3–5-nerved and feather-veined, and a solitary erect or drooping flower is borne with or without a stalk from the centre. The 3 outer segments of the perianth are sepal-like and persistent, while the 3 inner larger ones are petal-like. Stamens 6. Stigmas 3. Capsule a round or ovoid often 3-ribbed berry.
Culture and Propagation. — The Wood Lilies are interesting plants suitable for half-shady places in the flower border, or near shady walks, and also in shady nooks in the rockery. They like a deep well-drained peaty soil and plenty of water during the summer months. New plants may be obtained by carefully dividing the rootstocks in autumn when the plants are well established. Of the species described below *T. grandiflorum* is the best and most showy. They are all natives of N. America.

T. cernuum.—A species about 18 in. high, with broadly rhomboidal leaves 2–6 in. long, abruptly tapering to a point and shortly stalked. The rather small drooping flowers appear in April and May, having white wavy recurved inner segments, rather longer than the outside lance-shaped ones.
Culture &c. as above.

T. erectum (*T. fœtidum; T. pendulum; T. rhomboideum*).—This is variously known in America as Beth-root, Birth-root, and Lamb's Quarters. It grows about 1 ft. high, and has sessile broadly rhomboidal leaves, abruptly tapering to a point. The fetid flowers appear in May on stalks 1½–3 in. long, having dark purple inner segments. In the variety *album* they are greenish-white or rarely yellowish, and in *ochroleucum* yellowish-white.
Culture &c. as above.

T. erythrocarpum (*Painted Wood Lily*).—This is about the same height as the other species, with ovate tapering leaves 3–5 in. long, rounded at the base and shortly stalked. The flowers appear in April and May, the wavy inner segments being white striped with purple at the base.
Culture &c. as above.

T. grandiflorum (*Wake Robin*). — A fine free-growing species 12–18 in. high, with almost stalkless rhomboid ovate taper-pointed leaves 3–5 in. long, and snowy white flowers about 3 in. across, produced in May, and sometimes flushed with rose. The variety *maximum* is a larger flowered form.

Other Trilliums not so well-known are *nivale*, white; *ovatum*, similar to *grandiflorum* but earlier; *recurvatum* with purple recurved flowers; *sessile*, flowers at first yellow, afterwards deep purple, appearing in March and April; the variety *atratum* has blackish-carmine flowers of great distinctness, and another variety is white, striped and spotted with purple. *T. stylosum* from the S. United States (also known as *T. Catesbæi* and *T. nervosum*) produces its rose-tinted flowers in April and May, but is similar in habit to the others.
Culture &c. as above.

PARIS (Herb Paris). — A small genus of herbaceous plants with creeping rootstocks and simple stems with one whorl of 4 or more leaves, and solitary strong-smelling greenish flowers with 4–6 distinct segments, the outer sepal-like ones being spreading herbaceous, ovate or wedge-shaped, the inner petal-like ones linear or awl-shaped. Stamens 8–12, nearly hypogynous, sometimes as in *P. quadrifolia* with the connective produced beyond the anthers. Capsule a 4–5-valved berry.

P. quadrifolia. – An interesting but not very showy plant, native of Britain and the northern parts of the Old World. Its round stems 6–12 in. high have usually a single whorl of 4 obovate oblong leaves about 3 in. long, distinctly 3–5-nerved. The flowers appear in May and June, and are about 2 in. across, having 4 green lance-shaped outer segments or sepals, and 4 linear or thread-like yellowish petals, and 8 stamens with the connective much produced beyond the anthers. The black 4-sided berry is very conspicuous when the flowers wither.

Culture and Propagation.—This plant will grow in ordinary soil and may be naturalised in moist shady spots near water. Increased by dividing the rootstocks, and sowing seed as soon as ripe.

VERATRUM (False or White Hellebore).—A genus of distinct looking herbaceous perennials with thick creeping very poisonous rootstocks, and erect stems clothed with broad strongly nerved or plaited leaves contracted into a broad sheathing base. The purplish-green or white polygamous flowers are borne in branched panicles. The perianth consists of 6 spreading lobes united at the base into a short tube. Stamens 6, on the base of the segments.

Culture and Propagation. — Veratrums have a bold appearance and are useful for mixing with other fine foliaged perennials in good masses in borders or grassland. They like a somewhat shaded position, and a rich loamy soil to which may be added a little peat and leaf mould.

The plants may be increased by separating the tufts about September or October. Seeds may also be sown as soon as ripe, but they sprout very slowly and irregularly, and often do not appear until the second year. When large enough, the seedlings may be pricked out in light rich soil 12–18 in. apart and allowed to remain until large enough for flowering often several years after the seeds have been sown.

V. album (*White Hellebore*).—A fine perennial 3–5 ft. high, native of the pasture land in the Caucasus and Altai Mountains. The somewhat downy stems are furnished with large alternate sessile broadly oval leaves 1 ft. or more long, regularly folded or plaited. The flowers, which are whitish within and greenish outside, with spreading crisped denticulate segments, appear in July in dense panicles 1–2 ft. long. The variety *lobelianum* has wholly greenish flowers, with narrower segments than in the type; and the varity *viride* (*Helonias viridis*) from N. America has greenish flowers with lance-shaped segments, in loose lateral racemes, often reflexed.

Culture &c. as above.

V. Maacki.—A native of Siberia with slender stems about 2 ft. high, and lance-shaped leaves about 6 in. long, the lower ones being stalked, the upper ones sessile. The dark purple flowers with oblong segments, blackish at the base, appear in July in loose panicles 6–12 in. long.

Culture &c. as above.

V. nigrum. — An ornamental plant native of Central Europe with erect stems 2–3 ft. high, slightly bulbous at the base, and clothed with oblong plaited leaves 1 ft. long and 6–8 in. broad, narrowed at the base. The blackish-purple flowers, with oblong blunt segments, are borne in June in dense racemes 1–3 ft. long.

Culture &c. as above.

ZYGADENUS.—A genus of herbaceous plants having rhizomes or bulbs, and long linear leaves radical or clustered at the base of the erect simple stem, which ends in a simple or branched raceme of hermaphrodite or polygamous flowers. The perianth consists of 6 segments, sometimes united at the base into a very short turbinate tube, sometimes distinct, flat and rotately spreading. Stamens 6, on the base of the segments, having slender or stiffish filaments united round the style. Capsule ovoid or oblong, many-seeded.

Culture and Propagation. — These plants are not particularly showy but are of an interesting character attractive to many, especially those with a love of quaint appearance and botanical interest. They like a deep moist peaty soil, and may be grown on the shaded fringes of Rhododendron beds, or near water. The plants are usually increased by division in autumn or spring, and also by seeds which are produced in this country, and may be sown in cold frames as soon as ripe.

Z. elegans (*Z. glaucus*).—Also a native of N. America, 1–2 ft. high, with firm linear glaucous-green leaves, 1–1½ in. long, thickly nerved. The flowers appear in summer in loose racemes, and are greenish outside, white within, the oblong segments being thickly nerved.

Culture &c. as above.

Z. glaberrimus (*Helonias bracteata*). A North American plant 2–3 ft. high, with creeping rootstocks and linear grassy leaves 12–18 in. long, those on the stems being very much reduced. The small white flowers, with oblong acute distinctly clawed segments, appear in June, borne on loosely branched racemes 1–2 in. long.

Culture &c. as above.

These are the two kinds best known, but the following are occasionally seen in botanical collections:—***angustifolius***, 12–18 in. high, with white flowers turning to purple; *Fremonti*, about the same height with creamy white flowers; ***Muscætoxicum***, 1–2 ft. high, with greenish-white flowers; and *Nuttalli*, 6–18 in. high. with white flowers.

CXV. JUNCACEÆ—Rush Order

An order of herbaceous plants with a short and often perennial rootstock, erect simple stems, often with thick pith, and slender, flat or round leaves. The small green or brown hermaphrodite or diœcious flowers are borne in axillary or terminal cymes, and consist of a regular 6-parted inferior perianth in 2 series. Stamens usually 6, attached to the base of the segments, or hypogynous. Fruit capsular.

There are few plants of any garden value in this order. The common Rush, *Juncus effusus* (or *J. communis*), is a well-known native of marshy places. The variety *spiralis* is a curious plant with dense tufts of spirally twisted leaves, some being almost corkscrew-like. The plants of this variety come true from seed. By the edges of ponds they may be grown, if not for their beauty, at least for their singular appearance.

CXVI. PONTEDERIACEÆ—Pickerel Weed Order

A small order of aquatic herbs sometimes having the rootstocks creeping in mud, and sometimes floating in water, the leaf stems producing roots from the joints. The perfect leaves are long-stalked with a floating or emersed blade, the submersed leaves often being reduced to linear stalks without blades. The flowers are hermaphrodite, slightly irregular, or sometimes regular, and borne in terminal racemes or spikes. Perianth inferior, free from the ovary, and consisting of 6 lobes, more or less distinctly in 2 series. Stamens 6 or 3. Ovary superior 3-celled. Fruit a dry few- or many-seeded capsule.

PONTEDERIA (Pickerel Weed). A small genus of showy water plants with creeping rootstocks, long-stalked heart-shaped or oblong leaves (those of the stems being shortly stalked), and terminal racemes of blue funnel-shaped flowers, having an incurved slender or rarely shortened tube, and a somewhat 2-lipped perianth. Stamens 6, the 3 upper ones often sterile and enclosed, the 3 lower protruding.

P. cordata (*P. lanceolata*).—A beautiful N. American species 1–3 ft. high, with creeping rootstocks, and thick bright green lance-shaped cordate leaves on long stalks which are dilated and sheathing at the base. During the summer months the sky-blue flowers are borne in dense racemes, but are occasionally whitish with a greenish spot on the inside of the upper lobe. The variety *angustifolia* is recognised by its narrower leaves and smaller brighter blue flowers.

Culture and Propagation.—This is one of the finest and most showy water plants when grown in large masses, and is much admired for the elegance of its leaves, among which nestle the spikes of blue flowers. It is quite hardy and may be grown in shallow water or at the edges of lakes, pools &c. where its rhizomes can creep freely in the mud. It grows better submerged about a foot, and the water is also a protection from very severe frosts. Open sunny situations are best for the Pickerel Weed, which dislikes shaded places. It is easily increased by division of the tufts at almost any season, but preferably in spring. Seeds may also be sown in pots sunk in water. When the seedlings are large enough they may be pricked out and given more room.

Closely related are *Eichornea azurea* and *E. crassipes*, natives of tropical America. They will grow freely out of doors in most parts during the summer months, but require the protection of a warm greenhouse in winter. Small tufts are easily grown in bowls or tubs of water, and look very handsome when in bloom. Grown in pots or tubs they might be sunk in ponds and lakes during the summer months.

Division I. *PETALOIDEÆ* (p. 127). Series II. EPIGYNÆ (p. 127).

CXVII. HYDROCHARIDEÆ—Frog Bit Order

An order of aquatic herbs with floating or submerged, opposite or whorled leaves. Flowers usually diœcious, with a 6-parted perianth. Stamens at the base of the segments, 3, 6 or more. Ovary with 3 or 6 bifid styles. Fruit usually a berry, submerged, 1–6-celled.

HYDROCHARIS (FROG BIT).—This genus contains only 1 species:—

H. Morsus-Ranæ.—A pretty little water plant with fibrous and bulbiferous roots found in ponds and ditches in various parts of England. It is easily recognised by its roundish kidney-shaped leaves 1–1½ in. long, deep green above, reddish beneath. Flowers from July to August, erect, white, about 1 in. across, with broadly obovate crumpled petals.

Culture and Propagation.—This plant thrives in any still, clear, or muddy water and may be increased by seeds sown in pans of wet muddy soil when ripe, or in spring; or by runners which root at the joints transplanted in autumn or spring.

STRATIOTES.—A genus with only one species:—

S. aloides (*Water Soldier*).—A curiously interesting water plant, native of the ponds and ditches in the British Islands, and having short stolon-bearing rootstocks. The leaves spring upwards and outwards from the root, and are 6–18 in. long, deep green, tapering to a point, and with spiny teeth on the margins. The sub-diœcious flowers appear from June to August, and are about 1½ in. across, with 3 white or yellowish inner divisions larger than the 3 outer greenish ones. In the male flowers there are numerous stamens, but in the female ones there are mostly staminodes, and a compressed ovary with 6 linear styles.

Culture and Propagation.—This plant is grown more as a curiosity than anything else. It will flourish in any piece of water and may be left to increase itself at pleasure by means of its creeping rootstocks. When division is necessary it may be done in early autumn or in spring.

CXVIII. DIOSCOREACEÆ—Yam Order

A small order of plants often with tuberous roots, twining stems, and alternate leaves, remarkable for having netted veins, instead of parallel or curved ones, as in most other Monocotyledons. Flowers inconspicuous usually 1-sexed, and borne in axillary panicles or racemes. Perianth often bell-shaped and 6-lobed. Stamens 6, free. Ovary 3-celled. Styles 3.

There are only 8 genera and about 160 species in this order, and perhaps the most important plants in it are the Yams (Dioscorea), the fleshy roots of which are largely cultivated as articles of food in tropical and sub-tropical countries.

TAMUS (Black Bryony).—A genus having two species, the one here described being the best known :—

T. communis.—An ornamental native climber found growing wild in the copses and hedges in many parts of England. It has black ovoid fleshy rootstocks and slender angular branched stems which grow several feet long. The ovate heart-shaped tapering leaves are 2–3 in. long, with long stalks, and the minute flowers appear in May and June, and are succeeded by oblong red berries about ½ in. long.

Culture and Propagation.—Although a native plant and not remarkable for the beauty of its blossoms, the Black Bryony is nevertheless a beautiful plant for covering arbours, trellises &c. It flourishes in ordinary garden soil, and likes somewhat shaded positions. It may be increased by carefully separating the blackish rootstocks in spring or autumn, or by sowing seeds when ripe in cold frames. The common Bryony described at p. 461 is quite distinct from the Black Bryony in structure, although both plants agree in being climbers.

CXIX. SCITAMINEÆ—Ginger Order

An order of usually perennial herbs with more or less creeping or tuberous rootstocks, and leaves variously arranged, the stalk usually forming a sheath. Flowers hermaphrodite or rarely polygamous, irregular, borne in spikes, racemes, or panicles. Perianth superior, normally double, the outer portion calyx-like, the inner corolla-like, the segments variously united, or one or other absent. Stamens sometimes 5, equal, free, the sixth absent or small; often only one stamen perfect, the others being changed into irregular polymorphous variously united staminodes which are much longer than the perianth segments and brightly coloured, usually red or yellow, and form the showy part of the flower. Ovary inferior, 3-celled. Fruit crowned by the persistent calyx or naked, containing 1 or more seeds.

This order contains about 450 species widely distributed over the warmer parts of the globe. Many ornamental representatives are grown in hothouses, and although those mentioned below are grown out of doors in the British Islands during the summer months, they are not really hardy.

ROSCOEA purpurea.—A charming tuberous-rooted Himalayan perennial about 6 in. high, with lance-shaped tapering wavy leaves 4–6 in. long, stem-clasping at the base. Flowers in July and August, deep or pale purple with a broad drooping 2-lobed lip, and narrow perianth segments.

Culture and Propagation.—Although for many years grown as a hothouse plant, this species has proved quite hardy in the open air in the milder parts of the kingdom. It flourishes in rich and well-drained sandy loam and peat in sheltered spots, and may be increased by separating the tuberous roots in spring, or after the leaves and flowers have withered.

THALIA.—A small genus of herbaceous plants with fleshy rootstocks, large ornamental leaves, and flowers in loose spikes or panicles. Sepals 3, free, equal, membranous. Petals 3, free or very slightly united at the base. The andrœcium (or male organs) has a short tube and irregular petaloid lobes, one narrow one only bearing an anther. The 1-celled ovary becomes an oblong ovoid or roundish 1-seeded capsule.

T. dealbata. — A beautiful water or marsh plant 3–5 ft. high, native of Southern Carolina. It has creeping rootstocks and long-stalked heart-shaped ovate leaves 4–6 in. or more long, covered with a conspicuous blue-green 'bloom.' Its blue and purple flowers are borne in loose trusses well above the foliage from June to September.

Culture and Propagation.—This elegant plant although often grown in greenhouses is perfectly hardy in the mild southern and western parts of the kingdom, and looks charming when grown in bold masses near the edges of streams, lakes &c. It likes sheltered sunny situations, and the rootstocks should be buried in the mud at least a foot below the surface of the water if they are to remain undisturbed during the winter. When this plan is not adopted the plants may be grown in pots or tubs in sandy peat and loam and sunk in the water from May to October. They may then be lifted and stored under the stages in greenhouses or in cold frames in winter. The plants may be increased by separating the rootstocks in early spring, potting up the divided portions and growing on in a greenhouse until the end of May, when it will be safe to plant them out as a rule.

CANNA (Indian Shot).—A genus of erect often tall-growing perennial herbs with ornamental leaves and showy flowers in erect simple or branched racemes. Sepals and petals 3. Stamens petal-like, shortly tubular at the base, with narrow or wedge-shaped oblong lobes, the outer ones nearly equal, imbricate, sometimes 2 more or less united, the third one free, sometimes all absent; the 2 inner ones narrower, one being sterile, the other bearing a linear 1-celled anther with a petal-like lobe adnate at the side. Fruit a spiny 3-celled capsule with numerous hard roundish shot-like seeds from which the popular name 'Indian Shot' has been derived.

Although nearly 100 species have been described, Mr. J. G. Baker, who has studied these plants closely, is of opinion that they can all be reduced to about a dozen distinct species. These are of little use from an ornamental point of view, and are confined chiefly to botanical collections, but the magnificent hybrids which have been raised from them, and for which we are indebted in the first place to Continental nurserymen, are among the most showy and ornamental of plants for the summer garden. One of the first to obtain Canna hybrids was a M. Année of Paris, who in 1848 raised *C. Annæi* from seeds of *C. nepalensis*, which had probably been fertilised with the pollen of some other unknown sort. This strain became so popular that in 1861 over 20,000 tufts of it were used in the parks and squares of Paris, and from it have been derived a large number of the tall garden forms having handsome foliage varying in colour from soft green to reddish-purple.

In 1868 another fine strain was raised from the Peruvian *C. iridiflora*, and the Costa Rican *C. Warscewiczi*, and although believed to have been obtained first in Paris, was distributed by M. Kolb, inspector of the Botanic Gardens, Munich, being called at first *iridiflora hybrida*, but afterwards *Ehemanni*.

Within the last quarter of a century several other species have been taken in hand by such French nurserymen as Crozy, Sisley, Vilmorin, and Lemoine, and now we have beautiful forms which are variously known as 'Gladiolus-flowered,' 'Orchid-flowered,' besides numerous others simply called 'large-flowered' varieties. Besides the species mentioned above, *discolor*, *flaccida*, *glauca*, *liliiflora*, and *zebrina* have played a part, and as the original types are no longer used, their progeny has become thoroughly mixed and blended in garden forms. The result has been a new race with flowers of every shade of colour, among them being red, scarlet, yellow, orange, bronze, and intermediate shades, many of them distinctly washed and blotched with other colours.

Culture and Propagation.—Cannas are very easily grown. They like a deep rich sandy loam which has been well manured, and dug previous to planting. Warm sunny situations, sheltered from violent and cutting winds which tear the foliage, should be chosen, especially in northern parts of the country. The rootstocks may be obtained in the autumn after the foliage has withered, or in early spring, as they are then more easily transmitted without any soil adhering to them. During the winter months they are perfectly safe under a stage in the greenhouse or even in cellars or other places where Dahlia roots are stored from the frost. They may be potted in early spring and started into growth in a little heat and moisture, and when fairly well furnished with leaves may be moved to cooler quarters so as to be hardy enough to plant out by the end of May. Where the convenience of a greenhouse does not exist the rootstocks may be planted out in May where they are to bloom. In the south and other favourable parts of the country it is not absolutely necessary to take the roots up every autumn, but in such cases it is much safer to protect them with litter.

After planting, especially in the case of roots that have not been started in heat, the soil may be covered with a layer of short well-rotted manure or the remains of an old mushroom bed, and given a thorough good soaking with water. This treatment will enable the plants to become established more quickly and stimulate their growth. In hot dry summers the plants can hardly have too much water, and wherever clean luxuriant foliage and trusses of brilliant flowers are required, watering should on no account be neglected. It is best given in the evening, and about twice a week a soaking with liquid manure will be beneficial when the plants are growing vigorously.

Cannas are easily increased by seeds and by dividing the rootstocks. The latter operation is best performed in spring when the roots are to be started into growth in the greenhouse or planted out. Each bud or shoot carefully detached will make a new plant and the operation is easily performed with common sense and a sharp knife. Where choice and rare varieties exist, this is the best way to increase them.

Seeds may be sown in heat in early spring and when large enough to handle may be grown on in pots for the first season so as to make good plants for the outdoor garden the following season. The seeds being very hard sometimes take rather a long time to sprout. If soaked for 24 hours in warm water, or for several days in tepid water, before sowing, germination will be facilitated thereby, owing to the outer seed-coat being more or less softened.

Hybrid Cannas of the present day are among the most ornamental and useful plants for the outdoor garden during the summer months. They produce not only large and beautiful flowers, but have also a graceful habit and beautifully tinted large and luxuriant foliage which lends a sub-tropical air to the garden. Grown in masses or groups by themselves on the lawn, or near the edges of lakes or streams, or even in thin borders or shrubberies, they have a most picturesque appearance. When in beds on grass, the less showy flowering kinds may have large-flowered *Gladiolus brenchleyensis* or *Lemoinei* hybrids (see pp. 949, 951) mixed with them, as I have seen in Paris, and the effect when the Gladioli are in bloom is very charming.

As there is a good deal of variation in regard to height, it is advisable when planting Cannas not to mix tall and dwarf varieties indiscriminately. The taller varieties should naturally occupy the centre of groups, and so as not to appear too crowded when fully grown should be planted about 3 ft. apart. The outer rows of dwarfer kinds may be 18-24 in. apart, those on the extreme edge being closer together than the others. As a rule too many varieties should not be planted together unless due attention is paid to the coloration of the foliage, which is rather an important point for effect, and the best results are to be obtained by having the varieties separate or not more than 2 or 3 judiciously mixed.

The following is a short list of the best garden Cannas grown at present, but it must be borne in mind that new varieties are constantly appearing, and many mentioned below will a few years hence probably be unknown. They are arranged according to the predominating colours, but there are often streaks, blotches, or edgings of other colours.

Large-flowered Cannas with green foliage

Red and scarlet shades.—*Admiral Gervais*, *Aigrette*, *Alexandre Billiard*, *Alphonse Bouvier*, *Ami Pichon*, *Argos*, *Battle Standard*, *Beauté Poitevine*, *Bellona*, *Berthal*, *Bonfire*, *Ch. Henderson*, *Ch. Van Geert*, *Chevreul*, *Colonel Chard*, *Columbia*, *Columbus*, *Dragon*, *Duke of York*, *E. Milne*-

Redhead, *Ed. Mieg*, *Emile Lemoine*, *Emperor William II.*, *Etendard*, *Explorateur Campbell*, *F. R. Pierson*, *Felix Crousse*, *Flag of War*, *Flambeau*, *Flamingo*, *Francisque Morel*, *Frederic Benary*, *G. Sennholz*, *Gartendirector Siebert*, *Germania*, *Gloire du Montet*, *Goliath*, *Henri Martin*, *James Kelway*, *John Laing*, *Jules Chrétien*, *Kaiser Wilhelm*, *Königin Charlotte*, *L'Éclatant*, *Louis Thibaud*, *Madame Crozy*, *Madame Gimet*, *Madame Oriol*, *Madame Perrin des Iles*, *Marquise Arthur de l'Aigle*, *Martin Cahuzc* , *Maurice Musy*, *Ménélik*, *Meteor*, *Michelet*, *Miss Sarah Hill*, *Nardy Père*, *Nicola Racke*, *Obélisque*, *Panache*, *Papa Canna*, *Papillon*, *Paul Bruant*, *Persimmon*, *Peter Drummond*, *Princess Bonnie*, *Provençal*, *Quasimodo*, *R. P. Ker*, *Roi des Rouges*, *Shirburnian*, *Sophie Buchner*, *Souvenir de Antoine Crozy*, *Souvenir de Asa Grey*, *Strawberry*, *The Martian*, *Théophile Viard*, *Ulrich Brunner*, *Vice - President Luizet*, *Vicomte de Kerowartz*, *Victoria Cross*, *W. Pfitzer*, *William Bull*.

Yellow and orange shades.—*Admiral Courbet*, *Alsace*, *Amiral Avellan*, *Antoine Barton*, *Aurea*, *Ayrshire*, *Britannia*, *Burbank*, *Capitaine P. de Suzzoni*, *Carlton*, *Claribel*, *Colibri*, *Cometo*, *Comte de Bouchaud*, *Comtesse de l'Estoile*, *Conquerant*, *Conspicuum*, *Constantine*, *Constellation*, *Coronation*, *Côte d'Or*, *Delight*, *Domino*, *Doyen J. Liabaud*, *Dr. Vergely*, *Duchess of York*, *Edith Watson*, *Eldorado*, *Fashoda*, *Florence Vaughan*, *François Corbin*, *Françoise Crozy*, *Franz Buchner*, *Gloire Lyonnaise*, *Gloria*, *Gold-mine*, *Golden Queen*, *Henry Irving*, *Incendie*, *L. E. Baily*, *Langport King*, *Lord Kitchener*, *M. Cleveland*, *M. H. Debrouse*, *Madame Camille*, *Madame la Baronne P. Thénard*, *Madame Montefiore*, *Magnifique*, *Marie Corelli*, *Meteorite*, *Paul Meylan*, *Pavonia*, *Pioneer*, *Ponson du Terrail*, *Primrose*, *Progression*, *Queen of Denmark*, *Reichskanzler Fürst Hohenlohe*, *Sénateur Montefiore*, *Souvenir de François Gaulin*, *Spotted Gem*, *Sunbeams*, *Victoria*, *Wearne Wyche*.

Various shades. — *Ami Jules Chrétien*, soft chestnut-red or salmon shade, large, grand; *Antoine Chantin*, salmon, shaded cherry-red, large and round, very free; *Aurore*; *Comte Horace de Choiseul*, beautiful cerise-purple, very large; *Hippolyte Flandrin*, salmon-rose; *Jules Menoreau*, bright salmon-red; *La Guill*, large salmon, very effective; *M. Souleyberand*, large spikes, long petals, rich magenta, dwarf; *Madame Barrie*, apricot - coloured flowers; *Madame Chabanne*, large round flowers, rosy-salmon, with narrow yellow margin and light centre, dwarf habit; *Marcus Micheli*, soft rosy-crimson, narrow yellow margin, fine flowers; *Mdlle. Berat*, pink; *P. J. Berkman*, rich magenta shade; *P. Marquant*, flowers deep salmon, passing to rose-tinted carmine; *President Kruger*, flowers large and fine, salmon-red, edged and mottled light yellow, dwarf; *Rosalind*, rose-pink, large spikes, free, distinct; *Salmon Queen*, almost a clear salmon shade, very distinct; *Treyve Marie*, carmine and salmon, flowers large and well opened.

Large-flowered Cannas with bronze and purple foliage

Red, scarlet, and crimson shades.—*Admiral Avellan*, *Annette Novel*, *B. de Jussieu*, *César Bertholon*, *Charlemagne*, *Edouard André*, *Egandale*, *Geoffrey St. Hilaire*, *Graff O. de Kerchove*, *Ilona V. Lasykary*, *Isaac Casati*, *J. Cordieux*, *J. Montel*, *L. Montel*, *Légionnaire*, *Léon Vassilière*, *Mons. Rivoire*, *Multiflora purpurea*, *Paul Lorenz*, *Président Carnot*, *Président Dutailly*, *Rendatleri*, *T. H. Bichon*, *T. S. Ware*, *Victor Hugo*.

Various shades.—*Cronstadt*, reddish-salmon, shaded carmine, very large; *Général de Négrier*, garnet-purple, large flower, very free; *J. D. Cabos*, pleasing apricot shade, large; *Leonard Lille*, saffron - orange with purple - carmine edges; *Paul Bert*, circular flowers of a glowing umber shade; *Sénateur Milaud*, bright orange, excellent for lawns.

Large Orchid-flowering Cannas

Africa, purple-scarlet flowers, marked with yellow and orange, purple-bronze foliage striped green.

Alemannia, grows about 4½–6 ft. high. The outer petals scarlet with a very broad golden-yellow border; the inside of the blooms scarlet and dark red.

America, foliage of a beautiful bronze colour with dark red hues. The spikes large and flowers of a beautiful glowing reddish-purple, flamed and striped, height 4–5 ft.

Aphrodite, broad green leaves, large golden-yellow flowers spotted salmon, height 6 ft.

Asia, dark green foliage, large flowers of a rich golden-yellow, inner petal dotted scarlet, height 3 ft.

Atalanta, very large deep orange-carmine flowers, foliage greyish-green with dark border.

Australia, very large salmon-red flowers, striped sulphur-yellow, foliage dark green with brown border.

Austria, stems 6–9 ft. high, flower large bright canary-yellow dotted brown.

Bavaria, large green leaves with a bluish hue, very large spikes of flowers of a brilliant golden-yellow, covered all over with scarlet spots; extremely handsome, height 3 ft.

Borussia, green leaves, flowers canary-yellow with a golden hue, and red spots, height 3–4 ft.

Campania, large flowers, inner petals chrome-yellow with carmine spots, outer petals sulphur-yellow, glaucous foliage.

Charles Naudin, very large salmon-red flowers, foliage dark green bordered brown.

H. Wendland, broad green leaves, large flowers; petals scarlet, with a golden-yellow border; height 4 ft.

Heinrich Seidel, green leaves, flowers of a vivid fiery red, with yellow border; height 3 ft.

Iberia, glaucous leaves, flowers golden-yellow with red border, inner petals crimson, height 3 ft.

Italia, 4-8 ft. in height, flowers large, scarlet, tinged at the tips and margined yellow.

Kronas, broad sea-green leaves, flowers rich sulphur-yellow, spotted red, height 3 ft.

La France, leaves of a splendid purple, flowers brilliant yellowish-scarlet; height 4 ft.

Oceanus, bright green leaves, flowers yellow, spotted red, very beautiful, height 3 ft.

Pandora, purple leaves, flowers fiery red, the borders and inside of petals are gold-flamed; height 3 ft.

Partinope, sea-green leaves, flowers vivid dark orange-yellow, height 3 ft.

Perseus, glaucous green foliage, flowers canary-yellow with scarlet pencillings, height 3 ft.

Pluto, large purple foliage, extra large flowers, of a scarlet-purple, flamed red inside, height about 3 ft.

Professor Treub, large scarlet flowers, striped with salmon, broad bronze foliage, with a deep green hue.

Roma, large yellow flowers flamed with salmon-red, glaucous green foliage.

Suevia, Banana-like leaves, slender stalks, very large flowers, of a pure canary-yellow, and bronzed inside.

Trinacria, large and numerous sulphur-yellow flowers, green foliage.

William Beck, green leaves, sulphur-yellow flowers with scarlet pencillings.

MUSA (BANANA).—The Bananas are very closely related to the Cannas, but differ in having 5 out of the 6 stamens normal, the sixth one being represented by a small awl-like body without an anther, and there are no brightly coloured staminodes as in Canna. The only species of any value for the outdoor garden during the summer months is *M. Ensete*, an Abyssinian species with a thickish stem 1–3 ft. in diameter at the base, and attaining a height of 10–20 ft. The more or less erect oblong leaves when fully developed are 12–16 ft. long, 2-4 ft. wide, of a bright pleasing green, and a beautiful broad bright crimson midrib.

Culture and Propagation.—In warm parts of the country the effects of a group of plants of *Musa Ensete* can be well imagined. Even in midland and northern parts of the country this species may be grown outside in warm, sheltered, but not confined nooks, during the summer months, to give a tropical aspect to the vegetation. In autumn the plants may be lifted and stored on shelves in greenhouses. The leaves should be tied up and the roots covered with soil or a piece of matting. In early spring the plants may be started into growth like the Cannas, potting them up, or planting in a warm and moist corner of the greenhouse, and gradually hardening them off so as to be ready for the open air by the first week in June. Where large conservatories exist *M. Ensete* forms an ornamental subject planted out in beds of rich well-manured soil.

CXX. HÆMODORACEÆ—Snake's Beard Order

An order of smooth or downy perennials with short tuberous rootstocks, tufts of narrow linear leaves, and flowers in more or less dense panicles, clusters, spikes, or racemes. Flowers hermaphrodite, regular or slightly irregular. Perianth woolly or downy outside, with 6 distinct lobes or segments. Stamens 6, all perfect or 1–3 reduced to staminodes. Ovary inferior or half-inferior, usually 3-celled.

There are about 120 species belonging to this order, but very few of them are of garden value.

WACHENDÓRFIA.—A genus with about 7 species of tuberous-rooted perennials having a few sword-shaped or rarely linear leaves, sometimes large and more or less plaited. Flowers yellow in terminal and often hairy panicles or trusses.

W. thyrsiflora.—A South African species about 2 ft. high with simple stems and broad sword-shaped plaited leaves. The yellow flowers, with 6 lance-shaped acute segments, appear in early summer, about a dozen in a loose erect raceme.

Culture and Propagation.—This, the best known species, flourishes in sandy peat, loam, and leaf soil, but can be regarded as hardy only in the mildest parts of the kingdom. In severe winters the roots should be protected from frost and also cold rains by means of sheets of glass, handlights, or a little bracken &c. They may be increased by division of the tuberous roots in spring as growth is commencing or by means of seeds sown in cold frames or gentle heat when ripe.

OPHIOPOGON (SNAKE'S BEARD).—A small genus of herbaceous plants with short thickish rhizomes, tufts of long linear leaves, and small violet, blue, or white flowers borne in simple erect racemes. Perianth segments 6. Stamens 6. Ovary inferior 3-celled.

Culture and Propagation.—These plants are suitable for edgings to borders or for growing in bold masses in flower beds or nooks in the rockery. When in bloom they look ornamental, but the variegated forms are most attractive when not in bloom. They flourish in ordinary good and well-drained garden soil and may be easily increased by dividing the tufts in spring. They can scarcely be considered hardy except in the mildest parts of the kingdom.

O. Jaburan.—A Japanese species with tufts of deep green linear leaves 1½–3 ft. long, and spikes of white or lilac-tinted blossoms in July. The variety *variegata* is a beautiful plant with creamy-white or yellowish bands running down the green leaves.

Culture &c. as above. The variegated form of this species is largely grown in pots for greenhouse decoration.

O. japonicus.—Another Japanese species forming compact tufts of arching linear leaves 9–12 in. long and having white or lilac blossoms in loose spikes in June. The variety *variegatus* has the leaves striped with yellowish-white and is more ornamental than the type.

Culture &c. as above.

LIRIOPE.—A genus with only one species:—

L. spicata (*Ophiopogon spicatus*).—A pretty Chinese and Japanese perennial with tufts of radical linear lance-shaped 3-nerved leaves arising from a short thick rhizome. The small whitish or lilac bell-shaped flowers deeply divided into 6 segments appear late in summer and are borne in spikes 6–9 in. long.

Culture &c. as above for *Ophiopogon*.

TECOPHILÆA.—A genus having 2 species of perennials with fibrous-coated underground corms or tubers from which spring one or a few linear lance-shaped leaves. Scapes with one or few blue flowers with a 6-parted perianth. Stamens 6, attached to the throat of the tube, 3 being perfect, and 3 reduced to staminodes. Ovary inferior 3-celled, becoming a many-seeded capsule when ripe.

T. cyanocrocus (*Chilian Crocus*).—A charming Chilian plant 6–9 in. high, with fibrous-coated corms, each bearing 1–3 linear channelled wavy leaves. The sweet-scented flowers appear in March and April in loose trusses, and are of brilliant gentian-blue with a whitish centre. The variety *Leichtlini* has deeper blue flowers without a whitish centre, and the variety *Regeli* may be recognised by having narrower leaves and perianth segments.

Culture and Propagation.—From the Thames Valley southwards, and on the milder parts of the west coast, this pretty plant may be regarded as hardy when grown at the base of a south wall. In other localities it is safer to grow it in pots for cold frames or cool greenhouses. In the outdoor garden the corms (or bulbs, as they are popularly called) should be planted about August, in a compost of sandy peat and leaf mould, and at least 6-9 in. deep at the base of a south wall, so as to afford good protection in winter. In pots a depth of 3 in. will be sufficient. During wet cold weather the dormant corms should be protected with litter or handlights, as they like moisture only when in vigorous growth. The best way to increase the plant is by separating the offsets from the old corms and replanting in special beds until they attain flowering size. Seeds may also be sown in cold frames when ripe, but they do not flower for a few years.

CXXI. ORCHIDEÆ—Orchid Order

An order of perennial epiphytical or terrestrial herbs, the hardy ones mostly with fascicled or tuberous roots, and sheathing radical or stalkless cauline leaves. Flowers solitary, or in spikes, racemes, or panicles. Flowers usually hermaphrodite, irregular. Perianth superior, coloured, composed of 6 segments, the 3 outer of which are similar, and also the 2 inner side ones, whilst the lower segment, called the 'lip' or 'labellum,' is quite distinct from the others, often assuming peculiar forms and sometimes spurred at the base. Stamens and style united into a 'column.' Anther 1 opposite the lip, or 2, and opposite the side lobes in Cypripedium. Pollen waxy or granular, cohering in 2, 4, or 8 masses. Fruit a 1-celled 3-valved inferior twisted capsule, containing numerous minute seeds.

Between 300 and 400 genera containing about 5000 species belong to the Orchid family, but most of those in cultivation require to be grown in warm or cold greenhouses. They exhibit the greatest variation in size and structure, and a large number of them are exceedingly beautiful when in bloom—although far from handsome when not. There is no other family of plants which has so much excited and still continues to excite the wonder of all plant lovers, and now that large and beautifully flowering kinds are rarely found in a wild state, the gardener has devoted his attention to producing by means of artificial fertilisation a large number of beautiful hybrids.

The Orchids described below, although not to be compared in showiness or size to many of their tender exotic brethren, are nevertheless quite as beautiful and interesting in structure, and possess the great advantage of being more or less easily cultivated in the open air in most parts of the kingdom.

CALYPSO.—A genus with only 1 species:—

C. borealis.—A charming N. American Orchid having the stems usually thickened into 'pseudobulbs'—that is, stems resembling a bulb in appearance only, not in structure, about 1 ft. high, with ovate or heart-shaped, thin, many-nerved leaves. Flowers in summer, solitary, with delicate rosy-purple sepals and petals and a white lip crested with yellow, and heavily blotched with deep brown.

Culture and Propagation. — This species succeeds well in half-shady spots in more or less boggy situations at the foot of the rockery. The soil may be composed of peat, leaf-soil, sand, with a covering of coco-nut fibre in winter. The plants may be increased by offsets from the base, in spring, but it is not advisable to tamper with them too much unless fine clumps have become established.

CALOPOGON.—This genus contains about 4 species, all natives of N. America, but the following is the only one usually met with in cultivation:—

C. pulchellus (*Limodorum tuberosum*). A pretty tuberous-rooted Orchid about 18 in. high, with radical grass-like leaves. Flowers late in summer, in loose racemes, purple, the lip having a conspicuous tuft or beard of pale yellow hairs on the 'crest.'

Culture and Propagation.—May be grown in similar situations, but not quite so moist, as *Calypso borealis*. Increased by careful separation of the tubers in the resting stage.

ORCHIS.—A genus of terrestrial Orchids with roundish ovoid or palmately divided tubers and sheathing leaves. Flowers in dense loose spikes or in very short pedicellate racemes. Sepals and petals almost equal; lip 3- (rarely 4-5-) lobed, drooping, and spurred.

Culture and Propagation.—The kinds described below are the best out of some 80 species for garden purposes. They flourish in deep rich well-drained sandy loam mixed with a little peat. To obtain the best effects, the plants should be grown in masses, and are usually best in low level spots in the rockery in partially shaded situations. When the various kinds are grown together it is not unusual for them to fertilise one with another and thus produce hybrids naturally. In this way seedlings appear spontaneously, sometimes resembling one species more than another, but usually quite distinct from the type.

O. foliosa.—A showy species, native of Madeira, 1½–2½ ft. high, with oblong unspotted leaves and spikes of purple flowers about 9 in. long, produced in early summer. Sepals and petals almost similar; lip broad, drooping, 3-lobed, much longer than the spur.

Culture and Propagation.—This species may be grown in deep light soil in sheltered parts of the rockery. It may also be grown in pots, and plunged during the summer months outside, and in severe winters lifted and protected in cold frames or greenhouses.

O. latifolia (*O. palmata*).—*Marsh Orchis.*—A pretty British Orchid 1–3 ft. high, with oblong or lance-shaped leaves spotted with purple-black, and loose spikes of purple flowers borne from May to July. Lip obscurely 3-lobed, spurred and spotted.

There is a narrow-leaved form called *angustifolia*, a variety of a sub-species known as *incarnata* with lance-shaped acute unspotted leaves and flowers of a pale pink larger than the type.

Culture &c. as above. This species may be grown with *Calypso borealis* and *Cypripedium spectabile* in boggy or marshy ground, and increased by division in autumn. When grown with *O. maculata* there is always a chance of obtaining hybrids where the plants grow vigorously and flower freely.

O. laxiflora.—A pretty orchid 1–3 ft. high, native of the Channel Islands, with roundish tubers, unspotted lance-shaped leaves and loose spikes of bright reddish-purple flowers, produced in early summer; sepals and petals blunt; lip with large crenulate side-lobes, spotted, and having a stout blunt spur.

Culture &c. as above. May be grown in boggy soil, and increased by separation of the tubers in autumn.

O. maculata (*Spotted Orchis*).—A showy British species 6–18 in. high, with palmate tubers, and narrow oblong lance-shaped, usually spotted leaves. Flowers from May to July, very pale purple or white, spotted, rarely pure white, and borne in a dense oblong pyramidal spike. Lip deeply 3-lobed, spurred.

Culture &c. as above. May be grown in deep moist loam in shady parts of the rockery. Increased by separation of the hand-like tubers in autumn. In favourable spots seeds are freely produced and seedlings spring up spontaneously in spring. Plants obtained in this way are better than those obtained by division, and there is always a chance of securing a good hybrid, as this species often crosses readily with *O. foliosa*.

O. purpurea (*O. fusca*).—Another pretty British species found in Kent and Sussex on the Downs in chalky soils. It has ovoid tubers and stout stems 1–3 ft.

high, with oblong blunt leaves 3–5 in. long. Flowers in early summer, several on a spike, green and purple outside, paler inside and spotted, with a pale rose 3-lobed lip, spurred behind.

There are several other British Orchids that might be used with advantage like the above, among them being *O. Morio*, the Green Winged Orchis, *O. mascula*, *O. militaris*, *O. pyramidalis* &c. They should, however, all be transplanted from their natural habitats in autumn and not in spring, just as they are beginning to make their growth for the season. With them may be associated the Bee Orchis (*Ophrys apifera*), the Fly Orchis (*O. muscifera*), the Spider Orchis (*O. aranifera*), the Tway Blade (*Listera ovata*), the Fen Orchis (*Liparis Lœseli*), the White and Red Helleborine (*Cephalanthera pallens* and *C. rubra*), the Fragrant Orchis (*Habenaria conopsea*) &c.

Culture &c. as above.

CYPRIPEDIUM (Lady's Slipper Orchid). — A genus of terrestrial herbs with a short or creeping rootstock and erect leafy stems. The flowers differ from all other Orchids in having 2 stamens—1 on each side of the column, and the 2 lower sepals usually united into 1—thus making with the pouched or sac-like lip apparently 5 instead of 6 divisions or segments.

Culture and Propagation. — As a rule the best place to grow hardy Lady Slippers successfully is in a low-lying moist part of the garden sheltered from cold winds, but not exposed to the mid-day sun. The soil in which they grow best is a mixture of rough peat and well-decayed leaf-soil in about equal proportions. To this may be added a little fibrous loam and old Sphagnum or other moss, so as to retain the moisture. Although dampness is an essential in the good cultivation of Lady Slipper Orchids, the underlying soil upon which the peat, leaf-soil, moss &c. is placed to a depth of about 18 in. should be of a more or less porous nature, so as to allow the water to pass away freely and not remain stagnant at the roots. The plants may be increased by carefully dividing the roots with a sharp knife in autumn or early spring, care being taken not to injure the dormant buds.

The following is a list of the best hardy Lady Slippers, but there are many choice varieties, besides innumerable hybrids and crossbred varieties grown in warm glass houses.

C. acaule.—A rare species, native of the N. United States, with broad, light green, softly hairy leaves from the centre of which arises a stout scape, 8–12 in. high, in early summer, bearing a single large flower. Sepals and petals greenish, shorter than the drooping pouch, which is of a beautiful warm rose blotched with purple.

Culture &c. as above. This species succeeds in peaty or sandy soil and leaf mould but is rather difficult to grow well. It is also known as *C. humile*.

C. arietinum.—A pretty little species 7–10 in. high, native of N. America, with stiff leafy stems and solitary flowers in early summer. Sepals and petals greenish-brown; lip red, veined with white.

Culture &c. as above. May be grown like *C. acaule*.

C. Calceolus. — A rare British and European species with stems 6–18 in. high and oblong tapering, ribbed, downy leaves. Flowers in early summer, 1–2 on a stalk, with red-brown sepals, linear tapering petals, and a large obovoid pale yellow pouch.

Culture &c. as above. This is best in warm and rather sunny corners of the rock garden in rich well-drained fibrous loam. It is now very rarely met with in England, and great care should be exercised in dividing it in autumn.

C. californicum.—A beautiful Californian species 1–2 ft. high, with bright green lance-shaped tapering, or broadly ovate leaves. The small flowers appear about August and September, have dull yellow oval sepals, linear oblong tapering petals, and a whitish rounded lip spotted with rose or pale brown.

Culture &c. as above. This species is somewhat difficult to establish. It seems to grow best in moist shady places in a compost of sandy peat, leaf soil and moss.

C. candidum.—A rare N. American species about 1 ft. high, with oblong lance-shaped deep green and somewhat downy leaves. The small flowers appear in early summer, and have greenish-brown sepals and petals, and a white lip.

Culture &c. as above.

C. guttatum.—A rare and charming species 6–9 in. high, native of N. Europe and N. America, with twin, broadly ovate, downy leaves. Flowers in summer, rather small, solitary, of a beautiful snowy white heavily blotched or marbled with rosy purple.

Culture &c. as above. This should be grown in peaty soil mixed with leaf mould and sand, in partially shaded positions where it will have plenty of moisture during the growing period, but comparative dryness in winter.

C. japonicum.—A rare and distinct Japanese species 6–12 in. high with large twin heart-shaped light green leaves with crinkled edges. Flowers in summer, solitary; sepals greenish, spotted with red; petals and lip white, washed and dotted with crimson.

Culture &c. as above. This species flourishes in peat, loam and leaf soil, and likes shade and moisture in summer, but dryness in winter, and even a little protection with leaves &c. in bleak localities.

C. macranthum.—A handsome Siberian species 9–12 in. high, with bright green leaves and large deep rich purple flowers produced singly on the stems in early summer, and remarkable for the much-inflated pouch or lip.

Culture &c. as above. This species flourishes in rich heavy loam with a little peat and leaf soil.

C. montanum.—A pretty little Orchid about a foot high, native of Oregon, with lance-shaped downy leaves, and flowers with brownish-purple sepals and petals and a white lip, the interior of which is striped with red, the yellow column being spotted with crimson.

Culture &c. as above.

C. parviflorum.—A North American species closely related to *C. pubescens*. It has leafy stems 1½–2 ft. high, and rather small sweet-scented flowers. The sepals and spirally twisted petals are of a deep shining purple-brown, and the lip bright yellow.

Culture &c. as above. Flourishes in peat, loam, and leaf soil in sheltered moist and shady spots.

C. pubescens.—A beautiful N. American species 1½–2 ft. high, with lance-shaped ovate ribbed downy leaves and large flowers, 1–3 on each stem, in early summer; sepals and the narrow spirally twisted petals yellowish-brown with deep coloured veins; lip pale yellow, somewhat flattened at the sides.

Culture &c. as above. Grows well in well-drained peaty loam.

C. spectabile (*Moccasin Flower*).—A showy species 1½–3 ft. high, native of the W. United States, with downy ribbed ovate pointed light green leaves. Flowers in summer, large, white, slightly tinged with rose, the inflated and furrowed lip being of a bright rosy-carmine. The variety ***album*** has pure white flowers.

Culture &c. as above. This species flourishes in boggy peaty soil, and forms a handsome picture in the rockery or in moist borders facing north or east. Increased by division in autumn when well-established.

CXXII. AMARYLLIDEÆ—Daffodil and Snowdrop Order

A genus of bulbous plants, often with beautiful large sweet-scented flowers, borne singly or in clusters at the end of a scape. Leaves linear or strap-shaped. Flowers hermaphrodite regular, or slightly irregular. Perianth superior, consisting of 6 segments or lobes in 2 distinct whorls, the outer ones being sometimes larger or smaller than the inner. Stamens usually 6, inserted on the tube, throat, or base of the segments; filaments slender, free, or membranous and dilated at the base, and often more or less united to form a cup. Fruit inferior, capsular or fleshy, 3-celled.

NARCISSUS (Daffodil).—A genus of beautiful bulbous plants with narrow linear or strap-like radical leaves. Flowers usually white or yellow, solitary or in umbels, drooping or more or less nodding, issuing from a membranous spathe. Perianth tubular- or funnel-shaped below, with 6 spreading segments, and a circular cup-shaped or tubular appendage at the mouth of the tube called a crown, corona, or trumpet. Stamens free or adnate to the perianth-tube.

From the earliest times the Narcissus or Daffodil has been a popular flower, and poets who were not gardeners, and gardeners who were not poets, have sung its praises. It is essentially a flower of spring, and it is not astonishing that its great hardiness and exquisite beauty of form and colour have made it one of the most popular of garden plants at the present day. Thousands of bulbs are now planted where some years ago there were scarcely dozens. Gardens that were once dull and uninteresting are now clothed in spring with sheets of Daffodil blossoms of various forms and hues, and our public gardens attract by their means thousands of plant lovers, and thus stimulate them to go and do likewise but on a smaller scale in their own gardens. In fact any one almost can grow Daffodils, but as in other things some will grow them much better than others.

Position.—It does not matter much where the Daffodil is planted: it is always pretty; in the border, or in beds, in groups on the lawn, under trees, on grassy banks, or by the sides of lakes or streams, or in the wild garden or pleasure-ground. A visit to the Royal Gardens, Kew, in March and April will give an idea of the great beauty of the Daffodil when planted in hundreds in the grass and rising knolls. In such positions a mixture of varieties has a charming effect, but when grown in beds each variety looks better by itself than mixed with others.

Soil.—Any kind of good garden soil without peat will suit the Daffodil, but such a soil as that recommended for the Gladiolus, a deep and rather stiffish loam, will give grand results. Although requiring abundance of air and no stifling, Daffodils prefer a partially shaded position to a very sunny one, as their flowers last a much longer time.

Well-rotted stable manure and leaf-soil may be incorporated with the ground to enrich it, but should always be placed at least 9–12 inches beneath the surface, so that the bulbs do not come in direct contact with it. It is quite unnecessary to waste money on expensive chemical manures.

Planting. — Daffodil bulbs may be planted from August to Christmas, but as there is a 'best time' for doing everything in gardening, the month of September will be found the best time for planting most Daffodils to give the finest display of bloom the following spring. The bulbs should be planted from 2 to 4 inches beneath the surface and may be from 4 to 6 inches or even more apart.

Harvesting.—As soon as the foliage has turned or is turning yellow from May to the end of June, the bulbs may be lifted. It will be found that most of them have produced 2 or 3 side bulbs. These may be detached, and with the others stored in a cool dry airy place until required for planting again. Except when it is required to rapidly increase the stock, it is not necessary to lift the bulbs every year, but they should not be allowed to remain longer than 3 years without moving and dividing. They increase rapidly, and after this length of time will have fairly well exhausted the soil of nutriment.

Hybrid or *Seedling Daffodils.*—Although of recent years there has been a great influx of seedling and hybrid varieties of Daffodils, the practice of raising hybrids is very old, dating from the time of John Parkinson who flowered the first one he ever raised in 1618. The late Dean Herbert of Manchester took the matter seriously in hand and raised a good many. Dr. Edward Leeds, of Longford Bridge, Manchester (commemorated by the *Leedsi* group), Mr. W. Backhouse of Durham (after whom the *Backhousei* section is named), and Mr John Horsfield, a Lancashire weaver, who raised the ever-popular *Horsfieldi*, are among some of the earlier hybridists of Daffodils. Of late years the Rev. G. H. Engleheart of Appleshaw, Andover, has set about the work of raising Hybrid Daffodils carefully and scientifically, and his labours have been rewarded with some of the finest, purest and most charming varieties. Mr. Peter Barr, of London, Mr. W. Baylor Hartland, of Cork, and Mr. J. Allen of Shepton Mallet have also added considerably to the large number of hybrids in this country, while Mr. De Graaf of Leiden, and Herr Max Leichtlin of Baden-Baden, on the Continent, have also enriched our collections.

The process of raising hybrids is carried out in the same way as for raising Gladioli or any other class of plants. The brightest, warmest, and most favourable days are chosen, and the fertilised flowers marked. Where flowers of quite distinct groups are crossed, the parentage should always be recorded in a book kept for the purpose, and any circumstances that may possibly be useful later on should also be recorded. It is well to apply the pollen 2 or 3 times a day for several days in the case of flowers which produce rather infertile pollen or do not ripen seeds so well or so plentifully as others.

The seed being thoroughly ripe may be sown in pans or boxes of carefully prepared light sandy loam. The second year the young bulbs may be planted out in a prepared bed, and according as they make good growth may receive more room at each transplanting. It is a slow process, however, and from 3 to 6 years must elapse before flowering bulbs are produced, and it takes 2 or 3 years more to develop or establish the character of the seedlings. Many will be rank failures, perhaps, but as Mr. Engleheart has so successfully proved, there may also be some real gems among them.

From a botanical point of view the Daffodils are a good deal confused and mixed up, and the operations of the hybridist have not tended to make the task of the botanist an easier one. In the natural species I have adopted the names given by Mr. J. G. Baker, F.R.S., in his 'Handbook on the Amaryllideæ.'

A rough classification of the Daffodils would indicate two main and perhaps natural groups, viz. (1) those having only one flower on a stem or scape, and (2) those having more than one flower on a scape.

This would result in the following division :—

I. Narcissi with 1 flower on a scape.

1. N. **Bulbocodium.**
    - (*a*) *Graellsi.*
    - (*b*) *nivalis.*
    - (*c*) *hedræantha.*
    - (*d*) *citrinus.*
    - (*e*) *monophyllus.*
2. N. **Pseudo-narcissus.**
    - (*a*) *muticus.*
    - (*b*) *cyclamineus.*
    - (*c*) *major.*
    - (*d*) *minor.*
    - (*e*) *bicolor.*
    - (*f*) *moschatus.*

(Magnicoronati)

3. N. **incomparabilis.**
    - (*a*) *aurantius.*
    - (*b*) *albus.*

(Mediocoronati)

4. N. **poeticus.**
    - (*a*) *radiiflorus.*

(Parvicoronati)

II. Narcissi with more than 1 flower on a scape.

1. N. **triandrus.**
    - (*a*) *calathinus.*
2. N. **odorus.**
3. N. **juncifolius.**
    - (*a*) *gaditanus.*
    - (*b*) *minutiflorus.*
    - (*c*) *rupicola.*

(Mediocoronati)

4. N. **Tazetta.**
    - (*a*) *lacticolor.*
    - (*b*) *corcyrensis.*
    - (*c*) *patulus.*
    - (*d*) *ochroleucus.*
    - (*e*) *papyraceus.*
    - (*f*) *Panizzianus.*
    - (*g*) *dubius.*
    - (*h*) *canariensis.*
    - (*i*) *pachybolbos.*
    - (*j*) *polyanthos.*
    - (*k*) *italicus.*
    - (*l*) *Bertoloni.*
    - (*m*) *aureus.*
    - (*n*) *cupularis.*
5. N. **intermedius.**
6. N. **gracilis.**
7. N. **Jonquilla.**
    - (*a*) *N. jonquilloides.*
8. N. **viridiflorus.**
9. N. **serotinus.**
    - (*a*) *N. deficiens.*
10. N. **elegans.**
11. N. **Broussonetii.**

(Parvicoronati)

In the one-flowered section *N. Bulbocodium* and *N. Pseudo-narcissus* constitute Mr. Baker's *Magnicoronati*, and are characterised by having a funnel-shaped or cylindrical corona as long as or longer than the perianth segments. *N. incomparabilis* belongs to the *Mediocoronati*, which have a cup-shaped corona about half as long as the perianth segments. And *N. poeticus* belongs to the *Parvicoronati*, which have a small obconic or saucer-shaped corona.

In the section having more than one flower on a scape, only *N. triandrus*, *N. odorus* and *N. juncifolius* belong to Mr. Baker's *Mediocoronati*, while all the others belong to the *Parvicoronati*.

As there are now in cultivation a vast number of forms in which the coronas pass gradually from the small (*Parvicoronati*) to the large (*Magnicoronati*) section, it is often very difficult to decide into which group they should be placed. At least I have found it so, but never found any difficulty in deciding whether a flower-scape had one or more than one flower upon it. A comparison of the two sections will also show that the species in them are naturally closely related, more particularly those having more than one flower on a stem.

Where hybrids between the two groups have been obtained, it will usually be found that the result will end in favour of the group with more than one flower, as in the case of the one-flowered *incomparabilis* and *poeticus* crossed with the many-flowered *Tazetta*. The progeny have more than one flower on the stem, and range themselves naturally nearer the latter species. *N. biflorus*, classed as a species by Mr. Baker, has now been proved to be a natural hybrid between *poeticus* and *Tazetta*, and has been found growing with its parents near Montpellier.

The following is a list of the best species and garden varieties of Narcissus for cultivation out of doors:—

N. Backhousei. — A beautiful hybrid between *P. Pseudo-narcissus* and *P. incomparabilis*, having bold solitary horizontal flowers with a long lemon-yellow cup or corona and sulphur-yellow oblong segments over 1 in. long. There are several forms, among which *Wolley-Dod* with primrose segments and a deep yellow crown; *W. Wilks*, primrose with an orange-yellow corona; and *Joseph Lakin*, primrose, with deep yellow corona, are the best.

Culture &c. as above, p. 894.

N. Barri. — A handsome hybrid between *N. incomparabilis* and *N. poeticus*, having linear twisted glaucous leaves about 1 ft. long, and solitary horizontal or ascending flowers, with sulphur-yellow segments, and an obconic corona lemon-yellow at the base, passing into orange-yellow upwards. The following are some of the best forms grown:—

Baroness Heath, similar to *conspicuus*, but having smaller and rounded flowers.

Cinderella, divisions white, cup sulphur, tinged orange.

Conspicuus, large spreading divisions, cup orange-yellow, richly stained orange-scarlet.

Dorothy E. Wemyss, large white segments with canary-yellow cup edged with orange-scarlet.

Flora Wilson, large pure white perianth, lemon cup, edged orange-scarlet.

John Stevenson, sulphury - white, divisions expanded, cup tinged with bright orange and margined deep fiery orange.

Maurice Vilmorin, broadly imbricated pale sulphur divisions, large cup slightly contracted, of deep orange or orange-scarlet.

Miriam Barton, delicate primrose-yellow.

Mrs. Dyer, yellow, orange cup, late flowering.

Orphee, medium-sized flower, primrose-coloured, beautiful scarlet-margined cup.

Sensation, perianth pure white, cup bright yellow, beautifully margined with orange-scarlet.

Siddington, yellow segments, open cup, broadly edged with orange-red.

Culture &c. as above, p. 894.

N. Bernardi.—A beautiful late-flowering Daffodil, probably a natural hybrid, found wild in the south of France. It has white segments and an orange or lemon-yellow plaited corona, and emits a sweet fragrance. Mr. Baker ranks it as a form of *N. Macleayi*. The form called *H. E. Buxton* has white segments and a bright orange-scarlet cup.

Culture &c. as above, p. 894.

N. bicolor.—A distinct and beautiful form of *N. Pseudo-narcissus*, distinguished by having broad white spreading and much imbricated segments, 1½–2 in. long, and a large trumpet or corona about the same length, of a bright lemon-yellow, and 1–1½ in. or more across at the mouth, the rim of which is reflexed and crisped.

Culture &c. as above, p. 894. All the *bicolor* Daffodils are worth growing, and naturalised in grass-land make glorious spring pictures. The contrast in colour between the segments and trumpet is very striking. The following list includes some of the best forms:

Ada Brooke, a variety flowering between *Empress* and *Grandee*; perianth white, trumpet rich orange-yellow.

Cabeceiras, large rich yellow trumpet, elegantly frilled at brim, perianth white shading to primrose towards base.

Dean Herbert, perianth full primrose changing to sulphur, very large rich yellow trumpet.

Ellen Willmott, segments creamy-white, trumpet lemon-yellow, very fine.

Empress, one of the largest of this

group, flowers similar in colour to *Horsfieldi*, but of greater substance.

Grandee (*maximus*), trumpet large, lemon colour, perianth pure white, ten days later than *Horsfieldi*.

Horsfieldi, the trumpet is of a rich golden-yellow, with a white perianth. It is of great size, very early; as a cut flower it is grand.

James Walker (*albidus*), sulphury-white divisions, golden trumpet.

John Davidson, segments creamy-white, trumpet clear yellow.

Madame Plemp, broad white segments, large golden-yellow trumpet.

Michael Foster (*sulphurescens*), large yellow trumpet, sulphur perianth.

Mrs. J. B. M. Camm, large creamy-white trumpet and pure white perianth, one of the most distinct and finest of the *bicolors*.

Mrs. Morland Crossfield, large flower with pure white segments and clear yellow trumpet.

Mrs. Walter T. Ware, broad white segments, golden trumpet, well expanded and frilled.

Portia, soft primrose segments, yellow trumpet.

Prince Colibri, creamy-white segments, broad thick-set yellow trumpet.

Princeps (*Irish Giant*), immense pale sulphur trumpets, as large as *maximus*, sulphur or creamy-white segments, excellent for naturalising in grass.

T. A. Dorrien-Smith, sulphur-white segments, rich yellow trumpet.

Victoria, the finest of all the *bicolors*, early-flowering, divisions pure white, trumpet clear yellow, probably a cross between *Grandee* and *Empress*.

Weardale Perfection, a splendid Daffodil with large white segments, and an immense bold very pale primrose trumpet.

N. biflorus (*N. medio-luteus*).—*Primrose Peerless Daffodil.*—This is a natural hybrid between *N. poeticus* and *N. Tazetta*, and is similar to the former in habit. Two flowers, rarely one or three, are borne on a scape, and have pure white segments with an obconic pale yellow corona, much crisped on the edge. This pretty Daffodil is naturalised in parts of England and Ireland, but is a native of the south of France growing with its parents.

Culture &c. as above, p. 894.

N. Broussoneti (*Mogador Narcissus*). A very remarkable and distinct species native of Morocco. It has narrow strap-shaped pale glaucous green leaves 1½–2 ft. long, and two or three times twisted from left to right. From 6 to 9 pure white sweetly scented flowers are borne on the top of the scape, each blossom being about an inch across with a slender white tube 1½ in. long. The corona in the centre is rudimentary or almost absent, and 3 of the golden-knobbed stamens are inserted down the tube, the 3 others being inserted round the mouth of the tube and much protruding in comparison.

Culture and Propagation. — This species unfortunately does not appear to be of much value in the hardy flower border, as it is not only a shy bloomer, but also apparently flowers at the end of the year when our climate is most unfavourable. It will grow well under a south wall, but as a rule will not flower except in the warm atmosphere of a greenhouse.

N. Bulbocodium (*N. turgidus; Corbularia Bulbocodium; C. serotina*).—*Hooped Petticoat* or *Medusa Trumpet Daffodil.* — A charming and distinct Daffodil with ovoid bulbs about ¾ in. in diameter, and 3–4 roundish channelled leaves 3–12 in. long. The solitary flowers appear in April and May, bright yellow, with narrow lance-shaped segments and a very large broadly funnel-shaped or obconic corona, with entire or crenulate edges. There are several fine varieties of this, the best being *citrinus*, which has pale lemon-yellow flowers; *conspicuus*, rich golden-yellow; *Graellsi*, from the Castilian mountains, usually has 2 comparatively stout leaves and primrose-yellow blossoms; *hedræantha*, has a single leaf and small yellow flowers; *monophyllus* (or *Clusi*) from Algeria usually has a solitary slender leaf and snow-white flowers produced from December to February; *nivalis*, from the mountains of Central Spain, has 2–3 slender erect leaves and orange-yellow flowers; and *tenuifolius* with long rush-like leaves and small golden-yellow flowers has a more or less 6-lobed corona.

Culture &c. as above, p. 894. These pretty little Hoop Petticoat Daffodils are useful for rockeries and choice spots of the border in warm sheltered spots. Grown in pots they are charming in the cool greenhouse and conservatory.

N. Burbidgei. — A beautiful hybrid

Star Daffodil between *N. incomparabilis* and *N. poeticus*, having linear glaucous twisted leaves and a 2-edged scape about 1 ft. long. Flowers solitary with oblong spreading pure white segments and a yellow obconic corona edged with deep cinnabar-red.

Culture &c. as above, p. 894. All the *Burbidgei* Daffodils are beautiful, and excellent for naturalising in grass-land, flowering from March to the middle of May, and opening even before *poeticus ornatus*. The blooms last a good time in a cut state and are useful for floral decorations, bouquets &c. The following list includes the best forms of *Burbidgei*.

Agnes Barr, creamy-white segments, cup yellow, stained orange.

Baroness Heath, segments yellow, cup suffused with orange-scarlet.

Beatrice Heseltine, segments creamy-white, cup edged orange-scarlet.

Constance, divisions of perianth sulphury-white changing to white, expanded cup, beautifully edged orange-scarlet.

Crown Princess, divisions pure white, cup yellow, margined orange.

Ellen Barr, snow-white perianth, citron cup, stained orange-scarlet.

Falstaff, divisions pure white, lemon cup margined orange.

John Bain, divisions white, citron cup.

Little Dirk, small well-shaped flower, pale yellow with orange cup.

Mary, citron cup, stained orange, divisions white.

Mercy Foster, segments white, crinkled, cup canary-yellow, beautifully frilled.

Mrs. C. Bowley, segments pure white, cup glowing orange-red.

Model, divisions pure white, cup stained orange, beautifully frilled.

Ossian, segments white, cup orange-scarlet.

Princess Louise, perianth very large, pure white, cup much expanded, orange-scarlet changing to apricot, a very fine variety.

Robin Hood, divisions creamy-white, cup stained orange.

N. cyclamineus. — A charming little Portuguese Daffodil of the *Pseudo-narcissus* group, 6-8 in. high, having narrow linear leaves with a deeply grooved keel, and solitary drooping flowers borne on slender roundish stalks. The lemon-yellow segments are abruptly reflexed, reminding one of Cyclamen flowers, and the orange-yellow cylindrical corona or 'trumpet' has a serrated edge. The variety *major* has larger flowers than the type. Hybrid forms between this species and *N. bicolor Horsfieldi* and *N. obvallaris* (*major*) have been obtained.

Culture &c. as above, p. 894. The Cyclamen Daffodil, as it is appropriately called, is useful for choice parts of the rock garden or near the edges of lakes or streams, as it prefers rather moist soil. It may also be grown in pots like the Hoop Petticoat Daffodil. Seedlings will flower about 3 years after the seeds are sown, and as the plants are apt to die out when left undisturbed, every means of increasing them should be adopted.

N. gracilis. — An elegant Daffodil, native of Bordeaux, having bulbs about 1 in. in diameter, and narrow linear green leaves about a foot long. From 3 to 5 pure yellow, sweet-scented flowers are borne on a weak slender roundish stalk about a foot long, the segments being oblong-acute, about 1 in. long, and the corona obconic shallow. *N. tenuior* is similar, but more slender in all its parts, and has smaller sulphur-white flowers with a yellow cup, becoming paler with age. Mr. Baker retains *N. gracilis* as a species, but Mr. Nicholson, in his 'Dictionary of Gardening,' describes it as a hybrid between *N. juncifolius* and *N. Tazetta*.

Culture &c. as above, p. 894.

N. Humei.—A beautiful hybrid raised by Dr. Leeds of Manchester from the natural hybrid *N. poculiformis* and some form of *N. Pseudo-narcissus*. The drooping flowers borne singly on a stem have a distinct character, with oblong sulphur-yellow segments about 1½ in. long, and a shorter lemon-yellow corona, about 1 in. across at the mouth, which is minutely crenulate. The form *albidus* has milk-white segments and a lemon-yellow corona; *concolor* is a distinct form, with both segments and corona of a uniform yellow; and *Hume's Giant* has yellow flowers changing to primrose.

Culture &c. as above, p. 894.

N. incomparabilis (*Star Daffodil*).—A charming Daffodil, native of Central and S.W. Europe, but now naturalised in parts of the British Islands. The ovoid bulbs are 1-1½ in. thick, and develop about 4 linear glaucous leaves about 1 ft. long. The solitary scentless flowers, 2–3 in. across, have pale yellow segments and a lemon-yellow obconic corona. The variety *albus* has white segments and a lemon-yellow corona. From it has come the common double form known as 'Orange Phœnix.' The variety *aurantius* has pale yellow segments and corona, the latter being suffused with orange. From this form has come the double variety popularly known as 'Butter and Eggs.'

All forms of the *incomparabilis* Daffodil are beautiful for either indoor or outdoor decoration. They are sturdy and free-flowering, and naturalised in grass are very effective. Many of the distinct groups like *Barri*, *Burbidgei*, *Backhousei*, and *Leedsi* have been raised by means of this species, but each of these groups has been kept distinct in this work for the sake of convenient reference.

The following is a list of the best single forms of *incomparabilis*:—

Albert Victor, sulphur-white, with a deep yellow cup.

Annie Baden, pale sulphur-white, with a white orange-stained cup.

Autocrat, a bold handsome large flower, full self-yellow, with expanded yellow crown.

Beauty, perianth sulphur-yellow, with yellow bar, crown large and margined orange-scarlet, tall strong grower and free bloomer.

Bertie, perianth creamy-white and broad, cup yellow edged orange.

C. J. Backhouse, perianth yellow, cup long, and of a rich orange-red colour throughout.

Commander, pale sulphur perianth, large yellow cup stained orange-red.

Cynosure, large primrose perianth changing to white, cup stained orange-scarlet.

Dr. Gorman, pure white, pale yellow cup.

Edward Hart, perianth and cup deep yellow, of very distinct form.

Figaro, yellow, cup edged with orange.

Frank Miles, large flower, soft clear yellow, with gracefully twisted perianth, exceedingly effective in masses and excellent for cutting.

George Nicholson, perianth pure white, cup clear yellow, of fine form and great substance, late.

Gloria Mundi, fine bold clear rich yellow perianth, large cup much expanded and very heavily stained orange-scarlet, handsome and striking.

Goliath, large white perianth barred yellow, large yellow cup.

Gwyther, large broad yellow perianth, large cup suffused orange.

Hogarth, full yellow gauffered cup very large and expanded, perianth twisted; a quaint flower.

James Bateman, pure white broad perianth, clear yellow cup, a chaste flower of good substance and fine form; late-flowering.

King of the Netherlands, perianth sulphur, cup very large, spreading and stained orange.

Leedsi, perianth yellow, cup stained rich orange-scarlet, early.

Lorenzo, perianth soft primrose, changing to white, cup yellow, a distinct beautiful variety.

Lulworth, pure white perianth, cup bright orange-red. Some seasons the cup comes split, but when perfect it is a charming and beautiful flower.

Mabel Cowan, perianth white, cup broadly margined orange-scarlet, a fine flower of good substance.

Magog, perianth sulphur, large yellow cup.

Mary Anderson, perianth pure white, cup bright orange-scarlet, rather weak.

Poiteau, perianth white, cup yellow. of a stiff firm habit.

Prince of Wales, perianth sulphur, cup stained orange-scarlet.

Prince Teck, broad finely formed imbricated creamy-white perianth, cup yellow, large and expanded.

Princess Mary, broad and well imbricated creamy white perianth, large and much-expanded cup suffused orange.

Queen Bess, pure white perianth, with large light yellow much-expanded cup.

Queen Sophia, perianth sulphur, large, spreading, frilled cup, heavily stained orange-scarlet, delights in a good stiff fibrous loamy soil.

Semi-Partitus, perianth soft pale primrose, cup primrose, deeply lobed.

Sir Watkin (probably a hybrid between a form of *Pseudo-narcissus* and *poeticus*), perianth rich sulphur, cup yellow, slightly tinged with orange; the bold handsome flowers last long in water when cut, and it is a strong sturdy grower.

Splendens, large broad imbricated

sulphur perianth, large cup edged orange-scarlet.

Stella, large white perianth, with yellow cup.

Titan, perianth yellow, cup margined orange, flower large and well formed.

Among the double forms of *incomparabilis* may be mentioned:—*Butter and Eggs*, with large rose-shaped flowers, orange in the centre; *Primrose Queen*, large primrose-yellow, shading to orange in the centre; *Orange Phœnix* (or *Eggs and Bacon*), white with a rich orange centre; *Sulphur Phœnix* (or Codlins and Cream), pure white with a sulphur-yellow centre; and *White Queen*, a purer form than *Sulphur Phœnix*.

Culture &c. as above, p. 894.

N. intermedius.—A native of Spain and the south of France, and doubtless a natural hybrid between a form of *N. Tazetta* and *N. Jonquilla*. The ovoid bulbs are 1–1½ in. thick, having about 4 roundish bright green leaves about ¼ in. through, and deeply channelled down the face. The flower stalks are 1 ft. or more long, with an umbel of 4–10 flowers having bright lemon-yellow segments and an orange-yellow cup-shaped corona. The variety *bifrons* has narrower segments and a longer corona. A form called *Sunset* has canary-yellow flowers with a rich orange-scarlet cup.

Culture &c. as above, p. 894.

N. Johnstoni.—A beautiful Portuguese Daffodil, a natural hybrid between *N. Pseudo-narcissus Horsfieldi* and *N. triandrus*. It is somewhat variable, but the type has clear rich soft sulphur-yellow flowers. The best forms are *Queen of Spain* with soft clear yellow flowers scarcely rising above the foliage, having gracefully reflexed segments, and a straight cylindrical corona; *King of Spain* is very similar but has a shorter, wider and more spreading corona; *Mrs. Geo. Cammell*, from Spain, is a scarce form with soft clear self-yellow flowers; and *Snowdrop* is a beautiful pale sulphur-yellow or white form with a couple of drooping flowers on a stem.

Culture &c. as above, p. 894. All the *Johnstoni* hybrids prefer partially shaded spots and are useful for naturalising in grass.

N. Jonquilla (*Sweet-scented Jonquil*). A well-known Narcissus native of South Europe and Algeria with ovoid bulbs 1–1½ in. in diameter, and bearing 2–4 roundish bright green leaves 8–12 in. long, deeply channelled down the face. The slender roundish stalks bear umbels of 2–6 beautiful rich yellow flowers with a cup-shaped corona, highly valued for their delicious fragrance. The Jonquil is largely forced for conservatory decoration in early spring, but planted in a warm border having a south or south-west aspect it will flower very well out of doors, and its sweet-scented blossoms are always an attraction. The double Jonquil known as 'Queen Anne's Jonquil' is probably better for the conservatory than for the outdoor garden. The flowers are very double and of a rich golden-yellow (see *N. odorus*). Other forms of the Jonquil are *jonquilloides*, a more robust form than the type; *minor*, a dwarf form with very slender leaves and flowers only about half as large as those of the ordinary Jonquil; *Burbidgei*, in which the corona is cut into 6 segments almost to the base; and *stellaris*, recognised by its reflexing lance-shaped segments and distinctly 6-lobed corona.

Culture &c. as above, p. 894.

N. juncifolius (*Rush-leaved Jonquil*). A graceful little plant, native of Spain and Portugal and the south of France, with ovoid bulbs less than 1 in. in diameter, and 3–4 very slender round green erect leaves 4–6 in. long. The round slender peduncles 6–12 in. long have 1–4 stalked flowers on top, with bright yellow ovate segments about ½ in. long, and a cup-shaped corona of the same or a slightly darker shade. The variety *gaditanus* usually has more flowers with longer stalks in an umbel, and a truncated corona almost as long as the segments; *minutiflorus* has much smaller flowers than the type; and *rupicola* (or *apodanthus*) has rather glaucous leaves and a distinctly 6-lobed corona. It is very hardy and flowers and seeds freely. *N. scaberulus* from Portugal is closely related to *rupicola*. It has small bulbs and 2 prostrate linear glaucous leaves with rough edges and keels. The scapes are 2–4 in. high and bear 1–2 small yellow flowers with a cup-shaped corona and 3 protruding stamens.

Culture &c. as above, p. 894.

N. Leedsi (*Silver Star Daffodil*).—A beautiful hybrid between *N. poculiformis* and *N. incomparabilis*, having twisted channelled glaucous leaves and solitary horizontal or rather drooping flowers borne on 2-edged stalks longer than the leaves. Segments oblong-acute, milky-white, over 1 inch long; corona cup-shaped, sulphur-yellow, about ½ in. deep and wide at the mouth.

Culture &c. as above, p. 894. The *Leedsi* Daffodils are peculiarly chaste and beautiful flowers, and on rich loamy soil are excellent for beds, borders, and grass land. There are many beautiful forms grown, all good for cutting, among the best being:

Acis, large white, with orange-stained cup.

Albion, a large white flower with sulphur cup.

Amabilis, white divisions large and spreading, cup long and conspicuous, changing from primrose to white.

Beatrice, one of the most noble of this group, flowers pure white, elegantly shaped cup, rather late flowering.

Circe (*Gloriosus*, *Duchess of Brabant*), divisions white, cup canary yellow, changing to white.

Duchess of Connaught, long divisions, and large expanded cup, pearly-white.

Duchess of Westminster, large pure white perianth, long canary-yellow cup tinted orange.

Fanny Mason, an elegant form, white divisions, canary-yellow cup.

Gem, divisions and cup white; a lovely variety.

Grand Duchess, divisions of perianth white, cup expanded, stained orange.

Honble. Mrs. Barton, a fine large and well-shaped flower, large and broad divisions, large and expanded cup of a beautiful glistening white.

Ianthe, divisions sulphur changing to white, cup canary-yellow, very late flowering.

Katherine Spurrell, divisions very broad and overlapping, white of a beautiful lustre, cup bright yellow.

Madame Magdalene de Graaff, usually two-flowered, segments broad, creamy-white, crown orange.

Madge Matthew, divisions of perianth large white, well-formed cup.

Minnie Hume, perianth very large, pure white, cup much expanded, large canary-yellow, changing to white.

Mrs. Langtry, divisions of the perianth very broad, pure white, with cup margined golden-yellow.

Modesty, long silver-white segments, drooping over and much longer than the white corona.

Palmerston, large sweet-scented white flowers with a canary-yellow corona.

Princess of Wales, flower pure white, large expanded beautifully frilled cup.

Superbus, divisions large and drooping, pure white, cup changing from primrose to white; a fine massive flower.

N. Macleayi. — A charming little French Daffodil, no doubt a natural hybrid, with bulbs over 1 in. in diameter, and about 6 linear bright green leaves. The horizontal scentless flowers are solitary on a somewhat 2-edged stalk 1 ft. long, and have ovate oblong milky-white segments and a bright yellow corona, about ½ in. long and broad. Mr. Baker puts *N. Nelsoni*, *N. tridymus*, and *N. Bernardi* as forms of this Daffodil, but they are placed separately in alphabetical order in this work, as they represent distinct garden forms. *N. Sabini* is like *N. Macleayi*, but is a more vigorous plant with larger flowers and corona.

Culture &c. as above, p. 894.

N. major (*N. hispanicus*). — *Great Spanish Daffodil.*—A large and vigorous form of *N. Pseudo-narcissus* with leaves ½–¾ in. broad, and solitary flowers 2–2½ in. long, and of a bright lemon-yellow, the corona or trumpet having a deeply lobed and much crisped margin, and a throat about 1 in. across. *Maximus* is closely related but flowers more freely and has a more spreading rim to the trumpet. The rich deep golden-yellow blooms are also larger and make this variety one of the handsomest of the large Trumpet Daffodils. *Obvallaris*, known as the Tenby Daffodil, is a distinct early form with beautiful uniform yellow flowers. *Spurius* has broad imbricated segments and a large expanded corona, the whole flower being of a beautiful self-yellow. *Spurius coronatus* has pale yellow segments. *Telamonius* has sulphur-yellow segments and a deeper-coloured corona. The double-flowered form of this, *Telamonius plenus*, better known as *Van Sion* in gardens, is cultivated in great numbers for its fine golden-yellow double flowers, and is a first class kind for naturalising.

Culture &c. as above, p. 894.

N. minor.—Another distinct form of *N. Pseudo-narcissus*, but much smaller in all its parts, with leaves 3–4 in. long and about ¼ in. broad. The flowers are 1–1¼ in. long, with gracefully twisted oblong sulphur-yellow segments and a deeper yellow, deeply lobed spreading trumpet. The double form, *minor plenus* or Rip Van Winkle, has deep yellow flowers. The variety *minimus* is the smallest of the Trumpet Daffodils, only 3–4 in. high, with rich yellow flowers much smaller than the type; *nanus* is a strong-growing dwarf form with bright yellow flowers, the segments of which are longer than the corona, which is less lobed than in the type.

Culture &c. as above, p. 894. All this group of Daffodils are excellent for the edges of borders or shrubberies, and choice spots in the rock garden. They are also useful for pot culture.

N. moschatus (*N. candidissimus*).—A beautiful Pyrenean and Spanish Daffodil with the foliage and habit of *N. Pseudo-narcissus.* The attractive flowers are variable in size, having twisted segments 1–1¼ in. long, at first tinged with pale yellow, but afterwards pure white, and as long as the corona or trumpet, about 1 in. across at the incised-crenate and plaited rim. The variety *albicans* has larger flowers, with the corona more recurved at the rim; *cernuus* has silvery white drooping flowers, and *cernuus pulcher* is an improved form with a larger spreading primrose trumpet passing to white. There is also a pretty double-flowered form of *cernuus* with white blossoms, but it is rather rare. *Tortuosus* (also known as *Leda* and *Sarnian Belle*) has pure white twisted segments shorter than the trumpet, which is at first sulphur-yellow, but afterwards snowy-white.

Culture &c. as above, p. 894. The *moschatus* Daffodils as a rule prefer partially shaded situations and flourish in stiffish loamy soil. Most of them are suitable for naturalising in grass land, and also in the rockery.

N. muticus (*N. abscissus*).—This Pyrenean Daffodil is like *N. Pseudo-narcissus* in habit but has rather broader leaves, and flowers about 1½ in. long, with sulphur-yellow segments, and a deep lemon-yellow corona, about ¾ in. across.

Culture &c. as above, p. 894.

N. Nelsoni.—This is a beautiful and strong-growing form of *N. Macleayi*, having creamy-white segments about 1½ in. long, and ¾–1 in. broad, much imbricated, and a lemon-yellow corona or trumpet about half the length of the segments. The flowers of this group are very distinct and are valuable for cutting. They appear as a rule rather later than the flowers of the *bicolor* group (p. 896). Among the best forms of *Nelsoni* are the following:—

Aurantius, a lovely form, divisions white, very broad, straight cup, bright yellow, margined with orange-scarlet.

Border Maid, segments pure white, long clear yellow cup.

Major, flowers very large, white, cup yellow slightly tinted with orange, divisions broad.

Minor, pure white, cup yellow, medium flower, very late.

Mrs. C. J. Backhouse, divisions pure white, broad expanded yellow cup, distinct.

Mrs. E. G. Knights, white segments and bold stiff bright yellow cup.

Pulchellus, divisions white and cup yellow; flower drooping and well-formed.

Wm. Backhouse, broad white segments, clear yellow cup.

Culture &c. as above, p. 894.

N. odorus. — This is known as the 'Campernelle Jonquil' and is found wild in Spain and France to Italy and Dalmatia, but is now regarded as a hybrid between *N. Jonquilla* and *N. Pseudo-narcissus.* It has ovoid bulbs 1–1½ in. thick, and 3–4 narrow linear bright green rushy leaves about ¼ in. through, and deeply channelled down the face. The roundish scape 1–1½ ft. high bears 2–4 sweet-scented uniform bright yellow flowers with obovate oblong spreading segments, and an obconic corona about ½ in. deep, and ¾ in. across the 6-lobed and crenated mouth. The variety *heminalis* is a rare and distinct form with smaller sweet-scented golden-yellow flowers; *rugulosus* is a robust form with deep yellow flowers having a straight crinkle-edged corona; the variety *plenus* has sweet-scented double yellow flowers resembling a small Rose, and is popularly known as Queen Anne's Jonquil, a name also given to the double-flowered form of the Common Jonquil. It will be found in some works as a variety of *N. Jonquilla*, a proof that *odorus* has some connection with that species. The variety *minor* has flowers about 1 in. across and a much smaller corona than any other form.

Culture &c. as above, p. 894.

N. orientalis. — This is probably a hybrid between *N. incomparabilis* and

N. Tazetta, and bears 3–4 flowers on a much compressed scape, the spreading oblong acute segments being sulphur-yellow, about 1 in. long and ½ in. broad; corona cup-shaped, orange-yellow, deeply and irregularly 3-lobed.

Culture &c. as above, p. 894.

N. poculiformis (*N. montanus*).—This is stated to be a native of the damp valleys of the Pyrenees, and may be a natural hybrid between *N. Tazetta papyraceus* and *N. moschatus*. It has bulbs 1–1½ in. through, with about 4 linear glaucous leaves 1 ft. long. The angled scape, 1 ft. or more long, bears 1–2 fragrant pure white flowers with oblong spreading segments about 1 in. long, and a cup-shaped corona. This Daffodil is, I believe, cultivated at Kew, but does not appear to be offered for sale by the trade.

Culture &c. as above, p. 894.

N. poeticus (*Poet's* or *Pheasant's Eye Narcissus*).—Of all the Daffodils and Narcissi this is by far the best known and probably the most popular. It grows wild along the south of Europe from France and Spain through Germany to Greece. The ovoid bulbs are not much more than 1 in. in diameter, and produce about 4 linear glaucous leaves 1 ft. or more long. The beautiful white solitary flowers, 1½–2 in. across, are borne on 2-edged stalks from April to June, and have a delicious fragrance. The flattish corona has a circle of red or orange round the rim, and the radiating folds from the centre filled with yellow stamens are in beautiful contrast to the segments, and have been likened to the colours of a Pheasant's Eye; hence one of the popular names for the late-flowering variety called *recurvus*. Some forms flower earlier than others, among them being *ornatus*, a fine variety with large white symmetrical flowers having a corona rimmed with scarlet; *grandiflorus*, rather floppy, but very large, with a crimson-rimmed cup in the centre of the white flowers; *poetarum* has a bright orange-scarlet-edged corona; and *præcox grandiflorus* is one of the earliest, with large white flowers and a corona suffused with crimson. Other varieties not so well known are *patellaris*, strong and late-flowering; *stellaris*, also late-flowering; and *tripodalis*, early-flowering, with rather reflexed narrow segments.

Perhaps all the forms of *poeticus* are now surpassed in point of size and beauty by the fine hybrids or forms raised by Mr. Engleheart. These are not yet in commerce, I believe, but as they exist mention may be made of *Albatross*, *Seagull*, *Dante* (*ornatus* and *poetarum*), *Petrarch* (*ornatus* and *recurvus*), *Southern Cross*, and others.

In addition to the single-flowered forms of the Poet's Narcissus, mention must also be made of the double-flowered or 'Gardenia' Narcissus, derived from the variety *patellaris*. It flowers in June, and produces beautiful pure white rosette-like blossoms which are very sweet-scented and are excellent for cutting. The bulbs should be grown in strong rich soil, and are better shifted to a fresh piece of ground every year, as they have the misfortune to come 'blind' very frequently; that is, the flower-stalks are produced with great freedom, but the blossoms never open and remain in an undeveloped state in the spathe. It is difficult to remedy this defect, but a good mulching of manure in spring and plenty of moisture may assist in the development of the blossoms.

For naturalising in all kinds of places perhaps the Poet's Narciss is unsurpassed for giving effect in the spring months. By the sides of streams, lakes, ponds &c., on level grass land, or sloping ground, the commoner sorts may be planted by the thousand where space will permit, and they will produce a woodland picture difficult to surpass.

Culture &c. as above, p. 894.

N. Pseudo-narcissus (*Ajax* or *Common Trumpet Daffodil; Lent Lily*).—This is found wild in the copses and pastures in parts of England, and is particularly plentiful in some of the southern counties. The ovoid bulbs are 1–1½ in. thick, bearing 4–6 linear glaucous leaves about 1 ft. long. The large solitary flowers are borne in March and April on 2-edged stalks scarcely topping the foliage. In the type the oblong segments are pale sulphur-yellow, over 1 in. long, while the corona is lemon-yellow and over 1 in. deep, and as much across, with a plaited irregularly incised-crenate margin.

The flowers of this group are all showy and massive, and some remarkably beautiful forms have been raised during recent years in gardens. Among the wild varieties mention must be made of *cambricus* with sulphur-white segments and a yellow trumpet; *lobularis*, with segments and trumpet both lemon-yellow, the latter distinctly 6-lobed; *pallidus præcox* is an early-flowering Pyrenean form, rather variable in size and colour, but usually with very pale lemon-yellow to white flowers; it is excellent for moist grass land, but particularly dislikes to come in direct contact with manure; *rugilobus* is a fine variety with large primrose-yellow segments and a large yellow trumpet; *scoticus*, the Garland Lily, much finer and earlier than the Common Daffodil but otherwise similar; *variiformis* (or *nobilis*) is a Pyrenean form intermediate between the type and *N. moschatus*, having large white segments and a beautiful canary-yellow trumpet gracefully lobed at the rim.

There are six main sections of *N. Pseudo-narcissus* represented by *N. bicolor*, *N. cyclamineus*, *N. major*, *N. minor*, *N. moschatus*, and *N. muticus*, each of which is described separately in alphabetical order in this work as representing distinct types.

Many choice garden forms have been derived from these and the varieties mentioned above. They are usually divided into sections according to the colour of the flowers, but as there are imperceptible gradations from one colour to the other, it is impossible to draw any hard and fast line between the sections. The best garden varieties are here given in alphabetical order, as they will be more easily found.

Culture &c. as above, p. 894.

SINGLE-FLOWERED VARIETIES OF *N. Pseudo-narcissus*

Achilles, pale yellow, with deep yellow trumpet.

Alida, bright yellow trumpet, segments canary-yellow, late-flowering.

Alvarez, a dwarf, strong, free grower with flowers like those of a small *Emperor*.

Apricot, divisions of perianth white, trumpet tinged apricot, very fragrant.

Ard Righ (*Yellow King*), large yellow trumpet and pale yellow divisions, very early.

C. W. Cowan, a very fine and distinct trumpet, pure white in colour; it partakes somewhat in shape of a gigantic *N. calathinus*.

Captain Nelson, perianth and trumpet of a rich lemon, one of the largest of this group.

Cecilia de Graaf, perianth white, recurved, trumpet expanded.

Colleen Bawn, one of the most graceful and beautiful of all the white-flowering Daffodils, the trumpet is large and much expanded, divisions very broad, and pure white.

Coronatus, pale yellow, with a deep yellow trumpet.

Countess of Annesley, sulphur divisions and large rich yellow trumpet, and fine form.

Countess of Desmond, segments soft primrose, trumpet delicate yellow.

Duchess of Connaught, flowers primrose, changing to white.

Emperor, large yellow trumpet, divisions pale sulphur, grand for cutting.

Exquisite, a very distinct variety, divisions creamy, trumpet creamy-white, very early.

F. W. Burbidge, divisions white, trumpet sulphur, changing to white, long and elegantly fringed.

Fred Moore, large yellow trumpet, segments of great substance.

Glory of Leiden, the largest of the yellows, deep yellow, trumpet very large and expanded, long and broad divisions.

Goblin, flowers golden-yellow, trumpet deeper in colour than the segments.

Golden Spur, large golden-yellow trumpet, extremely free-flowering, very vigorous and early.

Golden Vase, deep orange-yellow trumpet, beautifully frilled.

Henry Irving, deep yellow flowers, beautifully formed, but very large; one of the earliest.

Hudibras, very distinct, trumpet deep yellow, divisions yellow and much imbricated, longer than trumpet.

John Nelson, large and long golden-yellow trumpet and divisions, late flowering, and very robust.

Lady Grosvenor, divisions white, trumpet sulphur-white, and beautifully recurved.

Madame de Graaff, this is the largest of all the white trumpets, pure white and of great substance.

Monarch, this resembles a glorified *Emperor* or a golden *Grandee*, but is larger and brighter in colour with a fine large trumpet and segments.

M. J. Berkeley, similar to *N. maximus*, but one third larger, and much-expanded trumpet.

Mrs. F. W. Burbidge, trumpet long and straight, primrose changing to white, perianth pure white.

Mrs. H. J. Elwes, flowers of a soft clear yellow, large spreading trumpet.

Mrs. Thompson, tall, robust growth, trumpet white, large, and much expanded.

Oporto Yellow, a very early trumpet with rich yellow flowers.

P. R. Barr, trumpet rich yellow, perianth deep primrose, very distinct variety resembling a dwarf *Emperor*.

Princess Ida, trumpet large, much expanded, of a delicate creamy-white, and very vigorous in growth.

Regina Margherita, long yellow trumpet and primrose divisions striped sulphur, very early.

Santa Maria, in colour and shape it resembles *maximus*, but is smaller and earlier in bloom.

Snowflake, large pure white trumpet, very distinct and beautiful.

W. P. Milner, perianth and trumpet sulphury-white, a dwarf and pretty free-flowering variety.

William Goldring, long snow-white divisions, much longer than the primrose trumpet.

DOUBLE-FLOWERED VARIETIES

Capax (*cystettensis*), soft lemon-yellow with starry petals; *grandiplenus*, deep yellow; *lobularis plenus*; *plenissimus*, very old double; *scoticus plenus*, double-flowered Garland Lily; *Pseudo-narcissus plenus*, the Double Lent Lily or Gerarde's White and Double Yellow Daffodil.

N. Tazetta (*Polyanthus* or *Bunch Narcissus*).—This, and not *N. poeticus*, is the Narcissus of the old Greek and Roman poets. It is concentrated chiefly in Italy and the south of France, but extends also from the Canary Islands and Portugal through the south of Europe to Syria, Cashmere, China, and Japan. With such a wide distribution, growing in various soils and temperatures, it naturally varies a good deal, and there are many forms. The type, as described by Mr. Baker, has bulbs 1½–2 in. in diameter, bearing 4–6 linear somewhat glaucous leaves 12–18 in. long and ½–¾ in. broad, bluntly keeled. A bunch or umbel of 4–8 flowers 1–1¼ in. across is borne on the summit of the distinctly compressed scape, the obovate segments being pure white, and the cup-shaped corona lemon-yellow, ¼–⅓ in. across.

Culture &c. as above, p. 894. The Tazetta Narcissi are chiefly grown in pots for conservatory decoration and are much valued for their trusses of sweet-scented flowers. In the open flower border they will, however, succeed very well grown in warm dryish soils sheltered from cold winds and protected from heavy rains and severe frosts in winter with a covering of straw, litter, leaves &c. The bulbs are usually planted in October or November and flower early in spring. In the Scilly Islands various forms of the Tazetta Narcissus, especially those known as the 'Scilly White' (*Tazetta ochroleucus*), 'Grand Soleil d'Or' (*T. aureus*) and 'Grand Monarque,' are grown, probably in millions, and tons of flowers are exported to the London markets every spring. A Chinese form of *N. Tazetta* which has attracted a good deal of attention during recent years is known as the 'Chinese Sacred Lily' or 'Joss Flower' and other fancy names. The large bulbs are grown in bowls filled with pebbles and clean water, and will grow rapidly and flower well in a sunny window in an ordinary dwelling room. The flowers are white with a yellow cup, and emit a sweet odour.

The Tazettas may be grouped as follows:—

1. Flowers having white segments and a yellow corona, including *Bazelman major*, *Couronne Blanche*, *Gloriosus Grand Monarque*, *Her Majesty*, *Maestro*, *Queen of the Netherlands*, *Staten General*, *Scilly White*, and *White Perfection*.

N. Bazelman minor has been proved to be a hybrid between *N. Tazetta* and *N. poeticus*, and a similar hybrid grows wild near Montpellier, somewhat like *N. biflorus*, but having 2–5 smaller flowers on a stalk.

The variety called *Tazetta romanus* is the well-known Double Roman Narcissus with white flowers, which with the 'Paper White' are forced into early flower in spring.

2. Flowers white; including the well-known '*Paper white*' Narcissus (*papyraceus*); *polyanthus* &c.

3. Flowers yellow, including *Grand*

Soleil d'Or, *aureus*, *Bertolini*, and *cupularis*.

N. triandrus (*Ganymede's Cup*). — A beautiful Narcissus, a native of Spain and Portugal, with bulbs ½–¾ in. thick, bearing 2–4 very slender roundish channelled leaves, and slender roundish scapes 6–12 in. long, having a cluster of 1–6 small drooping flowers on top; segments lance-shaped, sharply reflexed, pure white in the type, corona cup-shaped, truncate, white. The variety *concolor* has pale yellow flowers; *albus* is a charming white form called 'Angel's Tears'; *calathinus*, from the Isle of Glennans, Brittany, has large snowy-white or pale sulphur-yellow flowers; *pallidulus*, primrose-yellow; *pulchellus* has segments primrose-yellow, cup white, and is thus remarkable as being the only Narcissus having a paler coloured cup than the segments. It may also be noted that besides *N. triandrus* and its varieties the only other Narcissi having reflexed segments are *N. cyclamineus* and *N. Johnstoni*.

Culture and Propagation.— *N. triandrus* and its several varieties require to be cultivated with a little care, and so that the bulbs should not be lost it would perhaps be safer to grow them in pots, or in choice parts of the rockery where they are always under observation. As there cannot be too many examples of this lovely plant, it should be increased both by separation of the bulbs and from seeds. In suitable parts where the bulbs are left undisturbed for two or three years, seeds often sow themselves naturally, and in about three or four years produce flowering bulbs.

N. tridymus. — This comprises a distinct and interesting group derived from crossing the Trumpet Daffodil varieties, *N. Pseudo-narcissus* and *N. Tazetta*, more than one flower being borne on a stem. The best known forms are:—*A. Rawson*, with large bold yellow flowers; *Duchess of Albany*, sulphur segments, with a yellow cup; *Duke of Albany*, segments sulphur, cup orange; *Grand Duke of Hesse*, creamy-white segments, yellow cup; *Princess Alice*, similar with an orange cup; *S.A. de Graaf*, segments and cup yellow, the former changing to primrose; *Miss White*, elegant silvery-white flowers, 3–4 on a stem. *N. tridymus* is regarded as a variety of *N. Macleayi* by Mr. Baker, but from a garden point of view it is distinct enough to merit separate mention.

Culture &c. as above, p. 894.

GALANTHUS (Snowdrop). — A genus containing about half a dozen species of well-known hardy bulbous plants, with small strap-shaped leaves and solitary drooping flowers, the 3 outer segments of which are larger and quite distinct in shape from the 3 smaller inner ones.

Culture and Propagation. — Often flowering a few weeks after Christmas, and some of them before Christmas in October and November, Snowdrops are general favourites in all gardens where-ever they become established. They flourish in any ordinary good soil, but prefer a rich, sandy, well-drained loam, with a little leaf mould. The plants are readily increased by separating the bulbs after the leaves and flowers have faded, or later on about June or July. The bulbs should be replanted about September, but where they are not required for purposes of increase, there is no necessity to disturb them at all for several years. They require practically no attention and may be planted in large numbers in grassland for giving a fine effect in the early part of the year. In beds and borders they may be associated with Crocuses, Winter Aconites &c.

G. Alleni. — A native of Asia Minor, and probably a natural hybrid between *G. latifolius* and *G. caucasicus*, which are from the same region. The flowers however are about twice as large as those of *G. latifolius*, and the leaves are also larger.

Culture &c. as above.

G. caucasicus. — This is a Caucasian form of our Common Snowdrop from which it differs in having broader leaves, finally 8–9 in. long and ¾ in. broad, and flowers much later. The form known as *virescens* has the outer segments of the flower flushed with green. This form includes *Redoutei*, *major*, *caspius*, and *grandis*.

Culture &c. as above. Grows well in gritty loam.

G. Elwesi.—A native of Asia Minor, with very glaucous channelled leaves and roundish flowers, the 3 inner segments of which are dark green on the lower half and also around the sinus. The variety *globosus* has fine roundish flowers, with very broad outer segments, and *robustus* has a large bulb and thick glaucous leaves.

Culture &c. as above. In some places this species grows very poorly, but in others very freely. It seems to prefer light soil, and where well satisfied produces seeds freely.

G. Fosteri.—Herr Max Leichtlin has called this the 'king of Snowdrops.' The markings on the inner segments are like those of *G. Elwesi*, but the leaves are broader and blunter than in that species, resembling in shape and colour those of *Scilla sibirica* (p. 840). There are forms called 'Spot' and 'Leopard.' *G. cilicicus* resembles *G. Fosteri*, but flowers rather earlier, and has taller flower stems.

Culture &c. as above.

G. Ikariæ. — This is a new and distinct Snowdrop with broad glossy green recurving leaves, and snow-white blossoms, the inner segments of which are heavily tipped with green.

Culture &c. as above.

G. Imperati (*G. Clusi*). — A distinct form of *G. nivalis* from Naples and Genoa, but usually kept distinct in gardens. The leaves are broader and the flowers larger than in *G. nivalis*. There are two forms called *Atkinsi* and *Melvillei* which are improvements in size and vigour.

Culture &c. as above.

G. latifolius.—A very distinct Caucasian Snowdrop found wild at an elevation of 6000–8000 ft., and flowering in its native home in May, but in British gardens in February and March. The bright green strap-shaped leaves, simply channelled down the centre, are ¾–1 in. broad, and spring from bulbs 1 in. in diameter. The small white flowers have a delicate beauty, the 3 inner segments having a green blotch round the sinus both inside and out.

Culture &c. as above. This species likes gritty loam.

G. nivalis.—This is our well-known Common Snowdrop found in various parts of the British Islands, and throughout Europe. It has a small ovoid bulb, about ½ in. thick, from which spring 2 linear glaucous leaves 6–9 in. long when fully developed. The white solitary drooping flowers appear from January to March on a flattened scape 3–12 in. long, the 3 inner segments having a green patch round the sinus.

There are many forms, among which may be mentioned *corcyrensis* (*or præcox*) from Corfu, which flowers in December; *formosus*, *gracilis*, *maculatus*, *lutescens*, which has a yellowish ovary and the inner segments tipped with yellow instead of green; *maximus*, *octobrensis* from the Albanian mountains, a rather delicate variety flowering in October; *G. Rachelæ* is similar but has slightly larger flowers and broader leaves, and flowers a week or ten days later; *parviflorus*, *pendulus*, *poculiformis* is remarkable for having the inner segments plain white without green blotches, and almost as long as the outer ones; *pumilus*, *reflexus* with much smaller flowers than the type, the inner segments being reflexed at the apex; and *Scharloki*, which has 2 long spathe valves and sometimes 2 flowers on a stalk, and a green spot at the tip of each outer segment. There is also a double-flowered form of the Common Snowdrop in which the stamens have been transformed into petal-like bodies.

Culture &c. as above.

G. Olgæ.—A very rare Snowdrop, but still in cultivation, I believe, at Kew. It is a native of Greece and has channelled glaucous leaves 6–8 in. long and ¼ in. broad when fully developed. It flowers in October, and is therefore a fitting companion for the *octobrensis* form of *G. nivalis*.

Culture &c. as above.

G. plicatus. — This has larger bulbs than *G. nivalis* and very glaucous leaves, quite 1 ft. long and 1 in. broad when fully developed. They are channelled down the face and folded or reflexed at the edges—thus giving a distinct character. The flowers appear rather later than the other forms, and are ¾–1 in. long, the inner segments being green in the upper half with a white edge. There are several forms including *maximus*, *præcox*, and *Omega*, all from the Caucasus region.

Culture &c. as above.

LEUCOJUM (SNOWFLAKE). — A genus containing 9 species of pretty plants with tunicated bulbs and narrow linear or flat strap-shaped leaves. Flowers few in umbels, or reduced to one, often drooping, borne on a hollow scape.

Perianth broadly bell-shaped, with equal ovate or oblong segments. Stamens 6, epigynous.

Culture and Propagation.—Snowflakes are easily cultivated and prefer to grow in a rich sandy, loamy soil enriched with the addition of a little leaf mould but not too much farmyard manure—at least not in direct contact with the bulbs. They may be increased by separating the young offsets from the bulbs after the foliage has completely withered. Their use in the garden is the same as the Snowdrop, and grown in similar situations in large numbers they are very effective.

L. æstivum (*Summer Snowflake*).—A beautiful plant, native of Central and S. Europe, and also found in wet meadows and Osier holes in the south-eastern parts of England. The ovoid bulbs are 1–1½ in. through, producing linear obtuse bluntly keeled leaves 12–18 in. long. The drooping flowers appear in May 2–6 on a 2-edged scape, pure white, about 1 in. long, each segment being tipped with green.

Culture &c. as above. This grows freely and increases rapidly.

L. autumnale (*Acis autumnalis*).—A charming Portuguese species with roundish bulbs about ½ in. through and very slender leaves developed after the flowers. The drooping flowers appear in autumn, 1–3 on a slender stalk 3–9 in. high, and are white delicately flushed with pink at the base. The variety *cephalonicum* has a 2-valved spathe; and *pulchellum* from Algeria has large drooping flowers produced at the same time as the leaves.

Culture &c. as above.

L. hyemale (*Acis hiemalis*).—A native of S. France having brown-coated bulbs ½ in. thick, and 2–4 narrow linear leaves appearing at the same time as the flowers, and about 1 ft. long when fully developed. The white flowers tinged with green outside are usually borne singly on scapes 4–6 in. high in April, and not in winter as the name *hyemale* would lead one to expect.

Culture &c. as above.

L. pulchellum (*L. Hernandezi*).—This native of Sardinia and the Balearic Islands is closely related to the Summer Snowflake (*L. æstivum*), from which it differs in having narrower leaves and smaller flowers appearing a fortnight or so earlier.

Culture &c. as above.

L. trichophyllum (*Acis tricophylla*). A pretty Snowflake from Spain, Portugal, and N. Africa, with brown ovoid bulbs about ¾ in. through, bearing about 3 very slender leaves at the same time as the white flowers. The latter are borne 2–4 together on a very slender stalk 6–12 in. long in April, and have oblong lance-shaped segments, loosely 7-nerved. The variety *grandiflorum* (*Acis grandiflora*) has somewhat larger flowers.

Culture &c. as above.

L. vernum (*Spring Snowflake*).—A beautiful species, native of Central Europe from France to Bosnia and the Tyrol, but naturalised in parts of Dorset. It has round, pale green-coated bulbs about 1 in. through, and bearing 3–4 strap-shaped leaves 6–9 in. long when full grown. The sweet-scented flowers appear in March and April on 2-edged hollow scapes 6–12 in. long, drooping, white tipped with green. The flowers are usually solitary, but occasionally a 2-flowered form (*biflorum* or *Vagneri*) is seen. The variety *carpaticum* has the segments tipped with yellow instead of green.

Another species rarely met with is *L. roseum* (*Acis rosea*) from Corsica. It produces beautiful drooping rosy-red flowers in September and October on short slender stalks 2-4 in. long.

Culture &c. as above.

STERNBERGIA (MOUNT ETNA LILY; LILY OF THE FIELD).—A small genus of charming little plants with long-necked bulbs and strap-shaped leaves produced later than, or at the same time as, the flowers, which are usually solitary, erect, funnel-shaped, and bright yellow, having lance-shaped or oblong, more or less erect or spreading segments. Stamens inserted at the throat of the tube.

Culture and Propagation.—Sternbergias flourish in good sandy loam and leaf soil in sunny situations, and are charming flowers for brightening up the edges of borders, shrubberies, rock gardens &c. Unlike the Snowdrops and Snowflakes the flowers stand erect, and nestle among the foliage, and look extremely pretty when grown in masses. The bulbs should never be lifted until well ripened and without any foliage. During the winter they may be covered with leaves or litter as a protection against frost, and there is no necessity to move them for 2 or 3 years. The bulbs should be planted about 4–6 in. beneath the surface of the soil.

S. colchiciflora.—A very old garden plant, native of S. Europe and Asia Minor, with ovoid bulbs ½–¾ in. through, bearing 4–6 erect linear leaves 3–4 in. long in spring with the seed pods. The pale yellow, sweet-scented flowers, over 1¼ in. long, appear in autumn on a very short, almost subterranean stalk.

Culture &c. as above.

S. fischeriana.—A pretty Caucasian species similar to *S. lutea*, but differs in producing its large yellow Crocus-like flowers in spring instead of autumn.

Culture &c. as above.

S. lutea (*Amaryllis lutea*).—*Winter Daffodil; Yellow Star Flower.*—This beautiful plant, which is found wild on both sides of the Mediterranean eastwards to Syria and Persia, is supposed to be the 'Lily of the Field' alluded to in the Scriptures. It has been grown in this country over 300 years, and is known by its ovoid bulbs 1–2 in. in diameter, bearing 5–6 strap-shaped leaves 1 ft. long and ½ in. broad in September and October at the same time as the flowers. The large bright yellow flowers, over 2 in. long, are borne on slender stalks and nestle among the foliage. There are several forms of this species, including *angustifolia*, with narrower leaves and smaller flowers; *major* with broader leaves and larger flowers than the type; *græca*, from Greece, with very short leaves and flower-stalks; and *sicula* from Sicily, having larger flowers, but with more acute and narrower segments. The typical *S. lutea* is apt to die out, and is not so free or vigorous as some of its varieties—especially *angustifolia*.

Culture &c. as above.

S. macrantha (*S. latifolia*).—A beautiful species from the mountains of Smyrna and other parts of Asia Minor, with round bulbs 1–1½ in. thick, having a neck 4–6 in. long, and covered with pale or brown tunics. The blunt and slightly glaucous strap-shaped leaves are fully developed in June, but the bright yellow flowers, three times as large as those of *S. lutea*, with oblong segments about 1¼ in. broad, are not produced until September and October, on a stalk as long as the bulb neck, and issuing from a spathe 3–4 in. long.

Culture &c. as above.

ZEPHYRANTHES (ZEPHYR FLOWER).—A genus of bulbous plants with narrow leaves usually produced at the same time as the red, white, or yellow flowers. These are always solitary on a long slender hollow scape, issuing from a spathe-like bract. Perianth funnel-shaped, erect, or slightly inclined, with almost equal segments. Stamens inserted near the throat or middle of the tube.

Culture and Propagation.—Mr. Baker describes 34 species of Zephyr Flowers in his 'Handbook of the Amaryllideæ,' but only a few of these are really hardy enough for outdoor cultivation in the British Islands. Outside botanic gardens they are not very well known, but if grown in warm sunny borders, in stiffish, sandy well-drained loam, and in fairly large masses, they are very handsome. An odd plant here and there has a rather desolate appearance, and gives one the impression of living against its will. The bulbs may be left in the ground for 2 or 3 years, but during the winter months should be covered with leaves or litter to protect them from severe frosts, and also to throw off cold rains, which are not beneficial during that dormant period. Plants may be increased by the offsets from the bulbs, or by means of seeds, which are freely produced and readily germinate in gentle heat in the greenhouse.

The following are the best kinds for outdoor culture, so far as present experience goes:—

Z. Andersoni (better known as *Habranthus Andersoni*) from Monte Video is fairly hardy in the mildest parts of the country. It has pale green narrow leaves 5–6 in. long, and flowers which are yellow inside and coppery red outside, borne on slender scapes 3–6 in. long, in summer. It is not so showy as the other species.

Culture &c. as above.

Z. Atamasco (*Amaryllis Atamasco*). *Atamasco Lily.*—A beautiful species from the damp woods and fields of Virginia, with short-necked ovoid bulbs less than 1 in. thick, bearing 4–6 bright green narrow linear leaves. The scentless flowers, 3 in. long, are borne in early summer on stalks 6–12 in. long, and are of a pure white colour when fully open, but tinted pink or purple when young.

Culture &c. as above.

Z. candida (*Amaryllis candida; A. nivea*). — *Swamp Lily.* — This pretty Zephyr Flower is abundant on the marshes of La Plata, and has ovoid bulbs about 1 in. through with a neck 1–2 in. long. The bright green roundish leaves about 1 ft. long appear with the scentless flowers in September, and persist during the winter. The flowers are pure white, or slightly tinged with rose outside, and borne on slender stalks 6–9 in. long.

Culture &c. as above.

Z. carinata (*Z. grandiflora; Amaryllis carinata*).—A beautiful species, native of Central America and the West Indies, with short-necked, ovoid bulbs about 1 in. in diameter, bearing 4–6 linear shallow-channelled leaves 6–12 in. long. The beautiful deep rosy-pink flowers, 2–3 in. long, appear about June on stems 6–9 in. long, and last in perfect condition a long time. There is a certain amount of variation in the colour, and the form called *lilacina* is chiefly distinguished by lilac-tinted blossoms.

Culture &c. as above.

Z. rosea (*Amaryllis rosea; A. carnea*). A pretty Zephyr Flower from the Cuban mountains, with round bulbs less than 1 in. through, and producing about 6 linear bright green leaves at the same time as the bright rose-red flowers, about September and October.

Culture &c. as above.

Z. Treatiæ. — A handsome species, native of the damp swampy parts of Florida, having 6–8 grass-green leaves about ⅛ in. broad, produced from ovoid bulbs about ¾ in. in diameter. The white flowers about 3 in. long appear in early summer on a more or less purplish stalks 6–12 in. high, and have the segments keeled with red.

Culture &c. as above.

Z. tubispatha (*Z. nervosa; Amaryllis tubispatha*).—A native of the West Indies and Central American mountains, with short-necked roundish bulbs about 1 in. in diameter, and producing 4–6 narrow linear flaccid leaves over 1 ft. long at the same time as the white slightly fragrant flowers in early summer.

Culture &c. as above. This species has been in cultivation many years, and in conjunction with *Z. carinata* has produced a hybrid known as *Z. spofforthiana*. It is often grown in hothouses, but will flourish in the open border in warm sunny spots in the southern parts of the country. A little covering of leaves &c. is advisable in severe winters.

SPREKELIA (Jacobæa Lily).—This genus contains only the following species:—

S. formosissima (*Amaryllis formosissima*). — This beautiful and distinct plant, native of Mexico and Guatemala, was introduced to Europe in 1593. It has round brown-coated bulbs about 2 in. in diameter, bearing 3–6 linear green leaves 12–18 in. long and ½–¾ in. broad when fully grown. The bright crimson flowers about 6 in. across appear in April and May in greenhouses, often in advance of the foliage, on a hollow reddish stalk 6–12 in. long. The 3 upper segments are distinctly clawed, the middle one being about 1 in. broad in the centre, the narrower side ones recurved towards the tip, and the 3 lower ones united about half way from the base.

Among the forms of the Jacobæa Lily are *glauca* with glaucous leaves and smaller and paler flowers than in the type; *Karwinski* having less brightly coloured flowers with the segments keeled and bordered with white; and *ringens*, with glaucous leaves and drooping flowers, having the upper segment striped at the base and centre with yellow.

Culture and Propagation.—Although the Jacobæa Lily cannot be regarded as hardy except perhaps in the very mildest parts of the United Kingdom, it will nevertheless flower in the open air if the bulbs are planted about the end of May in warm sunny spots. The flowers will then appear about the end of July and August, and their peculiar shape and brilliant colour are sure to make them attractive. About the end of October the bulbs should be taken up and stored in a cool dry frost-proof place until the following season. The offsets from the bulbs will produce new plants.

HIPPEASTRUM. — A genus characterised by having tunicated bulbs, linear or strap-shaped leaves, hollow scapes with 2 or more flowers in an umbel, rarely solitary. Perianth funnel-shaped, more or less declinate, and having nearly equal segments, or the lowest of the inner row narrower. Stamens and style more or less bent down.

H. pratense (*Habranthus pratensis; H. speciosus*).—A beautiful plant native of the hills and plains of Chili, having short-necked ovoid bulbs about 1½ in. in diameter and linear leaves 12–18 in. long, produced at the same time as the flowers about May and June. The flower-stem is 1–2 ft. high, carrying 2–4 showy bright orange-red or scarlet blossoms, sometimes streaked with yellow at the base, the segments being about 2½ in. long. The variety called *fulgens* has more brilliant flowers than the type.

Culture and Propagation. — This plant flourishes in a rich sandy loam and leaf soil but requires warmth and shelter out of doors, as it is not quite hardy enough to stand the winter without protection especially in ill-favoured parts of the kingdom. In winter it is safer to cover the bulbs with a layer of leaves, straw, or litter. It is readily increased by offsets, but where the plants grow well they need not be disturbed for 3 or 4 years.

CRINUM.—A genus with large long-necked bulbs, broad persistent leaves and clusters or umbels of white or reddish flowers borne on a solid stalk. Perianth more or less funnel-shaped, with a long straight or curved cylindrical tube, and nearly equal, linear, lance-shaped or oblong segments. Stamens inserted at the throat of the perianth-tube, having long slender filaments, and linear versatile anthers.

C. longifolium (*C. capense; C. riparium; Amaryllis longifolia; A. capensis*). A noble S. African plant, with a bulb 3–4 in. through, gradually narrowed into a long cylindrical neck, and bearing about a dozen strap-shaped glaucous leaves 2–3 ft. long and 2–3 in. broad. About 6–12 large white flowers flushed with red down the back are borne during the summer months on a stout scape about 1 ft. or more long, and are highly attractive. There are several forms, including a pure white one *album*, *striatum* white striped with pink, and *farinianum* which has smaller funnel-shaped flowers of a soft pink colour, and bulbs with a very long neck.

Culture and Propagation.—This fine plant is perfectly hardy in most parts of England and Ireland, and even in Scotland it flowers well out of doors. In cold bleak localities, however, it is safer in severe winters to protect the plants with a cover of straw or litter and not to risk losing them. Grown in beds or borders or near the margins of pieces of water, the plants make a handsome display and give a sub-tropical effect to the surrounding plants. A warm deep rich loamy soil with abundance of water during the summer months suit this Crinum thoroughly. New plants may be obtained by separating the offsets from the base about April or May. To get them established more quickly, they may be potted and taken into a warm greenhouse for a couple of weeks before actually planting in the open flower garden. Large fleshy bulb-like seeds are freely produced in an irregular roundish capsule which ultimately bursts. The seed may be just placed on the surface of the soil, and in a short time will shoot forth roots and develop into a bulb with leaves.

Numerous seedlings and hybrids have been raised from this species in conjunction with others of a less hardy nature. The finest of them all is *C. Powelli* which has a round short-necked bulb, and about 20 spreading bright green leaves 3–4 ft. long and 3–4 in. broad. About 8 very large flowers are borne on a flattened glaucous scape about 2 ft. long, and have a deep reddish tint down the centre of the lance-shaped acute segments. There is a charming white form called *Powelli album*.

C. Moorei (*C. makoyanum; C. Colensoi; C. Mackeni; C. natalense*).—This is a fine species from Natal and Kaffraria, and is almost perfectly hardy in the milder parts of the United Kingdom. It has large ovoid long-necked bulbs bearing 12–15 bright green strap-shaped leaves 2–3 ft. long and 3–4 in. broad. The open bell-shaped flowers are 6 in. or more across, and of a pleasing soft pink colour. As many as 6–10 are borne in a cluster or umbel on the top of a stout scape 2–3 ft. long. There is a good deal of variation in the species, and this accounts for the several names which have been quoted as synonyms.

Culture and Propagation.—The best place to grow *C. Moorei* is in a warm south border in rich well-drained loamy soil. During the summer months it requires an abundance of water, and a mulching of well-rotted manure on the surface will be beneficial during very hot seasons. In winter it is safer to protect the plants with litter or matting from the frost. It may be increased by means of division or seeds in the same way as described under *C. longifolium* above.

AMARYLLIS (*Belladonna Lily*).—This genus is restricted to the one species described below, although the name Amaryllis is loosely used in gardens for plants which in reality belong to the genus *Hippeastrum* described at p. 910.

A. Belladonna (*A. pudica; A. rosea; Coburgia Belladonna*).—The fact that Linnæus applied the name 'Belladonna' to this species is in itself evidence that he considered it a very beautiful plant. It is a native of Cape Colony, and not of the West Indies as stated in some works, and was introduced to cultivation as long ago as the year 1712. In spring the ovoid bulbs, which are 3–4 in. through, produce 7–9 strap-shaped distichous dull green leaves 12–18 in. long and about 1 in. broad. From 6 to 12 funnel-shaped flowers, consisting of 6 nearly equal oblong acute connivent segments, are borne on the top of a solid scape 12–18 in. high, about August and September. They are horizontal and slightly drooping, and of a beautiful soft rose, emitting a sweet fragrance.

There are several forms of the Belladonna Lily, including *blanda* (*Coburgia blanda*), which has longer and broader leaves 2–3 ft. long, and larger and paler coloured flowers; and *pallida* which differs from the type only in having paler coloured flowers. Other forms have been called *rosea perfecta*, *speciosa purpurea*, and *spectabilis bicolor* or *mutabilis* in gardens.

There is one variety, however, which is far superior to them all, including the type. It originated in the Royal Gardens, Kew, and is known simply as the Kew variety of the Belladonna Lily. It is much more vigorous and free-flowering than the type, from which it differs chiefly in having a stouter scape twice as long, and bearing about 4 times as many flowers, which are of a rich rosy-crimson colour. It is said to be the result of crossing the ordinary *A. Belladonna* with *Brunsvigia Josephinæ*, and this may soon be satisfactorily proved as authenticated hybrids between these two species already exist. Any way, whatever its origin may be, there is no doubt as to its value as a most beautiful bulbous plant for the flower garden.

Culture and Propagation.—The Belladonna Lily and its varieties flourish in warm sunny spots sheltered from bleak cold winds. The bulbs should be planted about 9 inches deep in a rich compost of mellow loam, leaf mould and sand. Good drainage is essential and may be secured by placing a thickish layer of brickbats, clinkers &c. about 3 ft. below the surface of the border. If the bulbs are planted in autumn, it will be wise to cover them with a layer or heap of leaves, litter &c. as a protection against frost and also to throw off heavy rains which are of more harm than use to the bulbs in a dormant state. Once planted in a suitable position the bulbs need not be disturbed for four or five years. When transplanting becomes necessary, it is best done after the withering of the foliage. The bulbs are lifted and all offsets separated and replanted, allowing a distance of about 1 ft. between them. During the hot summer months the plants should receive copious waterings, and a mulching of well-rotted manure will also be beneficial, especially when the plants are growing freely.

LYCORIS.—A genus containing 5 species of perennial plants with short-necked tunicated bulbs and linear or strap-shaped leaves, not usually developed at the same time as the flowers, many of which are borne on a solid scape. Perianth funnel-shaped, rather irregular, with a short cylindrical tube, dilated at the apex, sometimes scaly at the throat; segments oblanceolate, nearly equal. Stamens and style long, filiform, declinate.

L. squamigera.—A striking Japanese species with large roundish bulbs, each bearing 5–6 narrow strap-shaped leaves about 1 ft. or more long. About July and August 8–10 large, sweet-scented, rosy-lilac flowers are borne on a stout scape 2–3 ft. long, after the leaves have withered and completely vanished. As many as 5 scapes each with a large truss of flowers are often produced from one healthy bulb, and when the plants are grown in bold masses they look very effective, and are likely to be mistaken for the closely related Belladonna Lily.

Culture and Propagation. — This species has flowered well in Mr. Worsley's garden at Isleworth in a south border, although it had not been protected in any way. It should receive the same treatment as the Belladonna Lily in regard to soil and propagation. There is no reason why other species of Lycoris should not prove as hardy as *L. squamigera*, at least in the southern and milder parts of the kingdom. Bulbs of most of them are easily obtained. The other species are *aurea* with beautiful golden-yellow flowers having crisped segments; *straminea*, pale yellow keeled with pink and sparsely dotted with red; *radiata* and *sanguinea*, bright red.

VALLOTA (Scarboro' Lily).—Like Amaryllis, this genus contains only one species:—

V. purpurea (*Amaryllis purpurea; A. speciosa*).—A beautiful and well-known S. African plant with large ovoid bulbs and strap-shaped bright green leaves 18 to 24 in. long when fully developed. The large funnel-shaped bright scarlet flowers consisting of 6 equal ascending connivent segments are borne during the summer months, 6–9 in a cluster, on the top of a hollow slightly 2-edged scape, 2–3 ft. long. There are several forms, such as *eximia*, having flowers about 4 in. across, with a white throat; *magnifica*, very similar to *eximia*; *major* and *minor*. There is also a rare white-flowered variety, and a hybrid between this species and *Cyrtanthus sanguineus* has been raised.

Culture and Propagation. — The Scarboro' Lily unfortunately is only suitable for cultivation in the flower garden in the very mildest parts of the kingdom, and even then it is always better to protect it in winter. It may receive the same treatment as the Belladonna Lily, but it is not so hardy as that beautiful plant. In winter the bulbs should be kept as dry and warm as possible in the soil by a good covering of leaves, straw, litter &c., and in warm sunny sheltered spots the bulbs need not be disturbed for 3 or 4 years.

PANCRATIUM.—A genus containing about a dozen species of perennials with tunicated bulbs having linear or strap-like leaves, and numerous flowers in umbels at the top of a more or less solid scape. Perianth funnel-shaped, with a long or medium tube, and 6 narrow erect or spreading nearly equal segments. Stamens 6 inserted on the throat of the tube, and having the filaments dilated at the base into a cup-shaped corona. Ovary 3-celled with an elongated style, and becoming a large 3-sided capsule with many seeds when ripe.

P. illyricum.—A native of S. Europe having large pear-shaped bulbs with a tapering neck 9–12 in. long, and covered with shining brown scales. The leaves are lance-shaped and covered with a glaucous bloom, and the white sweet-scented flowers appear in June in umbels on the top of a stout scape 1–2 ft. high just above the foliage.

Culture and Propagation. — This handsome bulbous plant flourishes in well-drained sandy loam in open sunny situations in the flower border, and looks effective if grown in bold masses. It is practically hardy in the neighbourhood of London and farther north, but is more at home in the milder southern and western parts of the kingdom. The bulbs should be planted 6–9 in. deep, and are best not disturbed for about 3 years if they flower freely. Increase is usually effected by separating the offsets from the old bulbs and replanting them immediately at the end of September, or not later than October. They should be protected from severe frosts and cold heavy rains by litter, leaves, handlights &c.

P. maritimum.—This is also a native of S. Europe, but is not so ornamental as *P. illyricum*. It has large pear-shaped bulbs with brownish-red coats, and glaucous lance-shaped linear leaves. The flower-stem or scape is about a foot high and bears at the summit 4-8 white sweet-scented flowers from July to September.

Culture &c. as above.

IXIOLIRION (Ixia Lily).—A genus of bulbous plants with linear leaves clustered at the base of a slender erect stem bearing an umbel of funnel-shaped flowers with almost equal oblanceolate acute ascending segments, longer than the stamens.

Culture and Propagation.—Ixiolirions are beautiful plants for the hardy flower border or rock garden. They prefer a warm sunny position and deep, well-drained, rich, sandy loam. During active growth they like a sufficient supply of moisture, but when at rest the bulbs should be kept as dry as possible if they are not taken up every autumn—say about September. In this case the bulbs may be kept in sand during the winter months free from frost, and about the end of March they and their offsets may be replanted in the open border. Seeds are sometimes freely produced and should be sown in cold frames or greenhouses as soon as ripe. They germinate the following spring, and the second or third year after sowing produce flowers. Owing to the slender nature of the flower stems they should be supported by means of thin stakes. In a cut state the flowers last a long time in fresh water and are useful for decorations.

I. **kolpakowskianum.**—A rare species native of Turkestan where it has been found at an elevation of 3000-6000 ft. The bulbs are only about half the size of *I. montanum*, with tufts of grassy leaves. The blue or whitish flowers are borne in April and May, and are composed of very narrow segments about 1 in. long, and cohering loosely at the base.

Culture &c. as above.

I. **montanum** (*I. Pallasi; Alstrœmeria montana; A. triflora; Amaryllis montana*). — A distinct and beautiful plant from Western Asia with ovoid bulbs about 1 in. in diameter, and with a neck 2-3 in. below the lower tuft of grassy leaves. The bright lilac funnel-shaped or somewhat spreading flowers are borne in loose and graceful umbels in early summer, and have the segments distinctly 3–5-ribbed. The variety *tataricum* (or *Ledebouri*) has more slender stems and awl-shaped leaves, and flowers somewhat smaller than in the type. The form known in gardens as *macranthum* has much larger flowers than the type. There is a good deal of variation in the colour, which is sometimes very deep and sometimes pale.

Culture &c. as above.

ALSTRŒMERIA (Peruvian Lily). This genus is remarkable in having no bulbs but a mass of thickened or tuberous roots from which spring leafy stems bearing clusters or umbels of richly coloured and often spotted flowers, with a more or less irregular limb, the lower segment of the inner row especially being different from the others, while the 3 outer segments differ in shape from the inner ones. The linear lance-shaped or ovate leaves are inverted by the twisting of the stalk.

Culture and Propagation. — When grown in large masses or beds, Alstrœmerias are very effective and showy plants in the flower garden. They require a deep rich and well-drained soil composed of sandy loam and leaf soil, and also well-rotted manure added some weeks before planting. A warm sheltered position with a more or less southern aspect suits them best, especially near a south wall or thick hedge. During active growth and the hot summer months copious waterings may be given, and a mulching of well-rotted cow or stable manure will impart additional vigour to the plants, and enable the flower stems to stand erect without being staked. The period of flowering may be considerably lengthened by cutting away the fading flower stalks as early as possible. As the blossoms last well in a cut state they are useful for indoor decoration, and their detachment from the plant is beneficial to the latter.

Alstrœmerias are readily increased by carefully separating the clusters of fleshy roots into as many pieces as there are crowns either about September when the foliage is browning, or in early spring just as growth is about to begin. The plants, however, are best left undisturbed unless there is urgent need to increase the stock. Seeds may also be saved, and sown very thinly in cold frames or greenhouses in shallow boxes, pans or pots when ripe or in early spring. When the seedlings are large enough to handle they should be pricked out into a nice compost of sandy loam, leaf soil and a little peat, and grown on in a greenhouse until established. They are best left growing in pots or pans for the first year, as owing to their brittle nature they are readily injured if transplanted to the open border when too young.

The best time for planting Alstrœmerias is probably in March or April according to the season and the state of the weather. The roots should be buried about 6 or 9 inches deep, and about 1 ft. should separate one plant from another. Although fairly hardy, it is wise in severe winters, especially in northern parts, to take the precaution of covering the plants with leaves or litter as a protection against frost and cold rains, so as to keep the roots as warm and dry as possible during that period.

Mr. Baker has described 44 species, but the following are the best for the outdoor garden:—

A. aurantiaca (*A. aurea*). — A fine vigorous Chilian species 2–4 ft. high, with thin lance-shaped leaves rather glaucous beneath, the lower ones 3–4 in. long. During the summer and autumn months masses of orange flowers streaked with red or carmine, the outer segments being tipped with green. The variety *concolor* has pale unspotted flowers.

Culture &c. as above.

A. brasiliensis. — A Brazilian species 3-4 ft. high with oblong lance-shaped non-inverted leaves about 2 in. long, and reddish-yellow flowers, the inner segments being spotted with deep brown.

Culture &c. as above.

A. chilensis. — A beautiful Chilian species 2–3 ft. high with more or less obovate spoon-shaped rather glaucous twisted leaves minutely fringed at the edges. The blood-red or pink flowers have the 2 upper inner segments lined with yellow. There are many seedling forms of this plant in gardens, having a great variety of colour from blush-white to deep orange or red.

Culture &c. as above.

A. Errembaulti is a garden hybrid from *A. pulchella*, about 2 ft. high, having white flowers spotted with crimson. It is rather tender and requires winter protection.

Culture &c. as above.

A. hæmantha.—This is a plant figured in the 'Botanical Magazine,' t. 2854, as *A. pulchella*, and as *A. Simsi* in Sweet's 'British Flower Garden,' t. 267. It is a native of Chili and grows 2–3 ft. high, and has crowded, thin, lance-shaped leaves 3–4 in. long, glaucous beneath, the upper ones being linear. The outer segments of the flower are bright red tipped with green, the narrower inner ones having red-purple spots on an orange ground. The variety *albida* has whitish flowers.

Culture &c. as above.

A. pelegrina (*Lily of the Incas*).—A beautiful Chilian species about 1 ft. high, cultivated in Messrs. Lee's nursery at Hammersmith as long ago as 1774. The leaves are thin lance-shaped and about 2 in. long, and the outer segments of the lilac flowers are 1 in. broad, while the inner ones are heavily spotted with reddish-purple. The variety *alba* is a beautiful form with white unspotted flowers. It is, however, rather tender and requires the protection of a cold frame or cool greenhouse, where it makes a fine subject in pots.

Culture &c. as above.

A. pulchella (*A. banksiana; A. psittacina*).—A Brazilian species 2–3 ft. high, with scattered more or less lance-shaped leaves and clusters of dark red flowers tipped with green, all the segments, which are very unequal, being spotted inside with brown. Rather tender.

Culture &c. as above.

A. pulchra (*A. bicolor; A. Flos-Martini*).—*St. Martin's Flower.*—According to Mr. Baker this pretty plant is a variety of a Chilian species called *A. Ligtu*, and grows about 2 ft. high, with linear or narrow lance-shaped leaves 2–3 in. long, and flowers variously coloured with purple, yellowish-white, and deep yellow, dotted with red and flushed with pink. Rather tender.

Culture &c. as above.

A. versicolor (*A. peruviana*).—A pretty Peruvian plant 2–4 ft. high, with obliquely lance-shaped stalkless leaves, and yellow flowers spotted and striped with purple or maroon, and tipped with green. This is a strong-growing species with several beautiful garden forms.

Other kinds sometimes met with are *revoluta*, with bright yellow spotted flowers; *sulphurea tigrina*, yellow spotted with brown; *Hookeri*, yellow streaked with red; and *tenuifolia*, rosy-violet.

Culture &c. as above.

POLIANTHES (TUBEROSE).—This genus consists of one species only:—

P. tuberosa. — A charming Mexican plant, with a tuberous rootstock and thin linear bright green leaves 12–18 in. or more long, deeply channelled in the lower half, and more or less spotted with brown behind. The flower spikes on plants grown in the open air appear about August, and are 2–3 ft. high, bearing near the end several pure waxy white funnel-shaped flowers which emit a strong scent considered delicious by many, but rather heavy and sickly by some. There is a variety called *gracilis* having a more slender habit and narrower leaves. The double-flowered variety is that most generally grown, and is largely cultivated in greenhouses to supply the requirements of floral artists. They are known as Double African, Double American, Double Italian, and Pearl Tuberoses, the latter being the favourite as it does not grow so tall as the others.

Culture and Propagation.—The tuberous rootstocks, or bulbs as they are popularly called, may be planted in the flower garden about the end of May when all danger from severe frosts is practically past. They will grow in ordinary garden soil, but prefer rich well-manured loam, with a fair supply of water while growing.

In the mildest parts of the country the plants may be left in the soil during the winter, but should be protected with leaves, straw, or litter, and kept as dry as possible. Or in less favoured spots the bulbs may be taken up about the end of September, and stored in sand in a dry frost-proof place until the following season. On the whole, however, perhaps it is best to buy fresh strong imported bulbs every year, as they are not likely to ripen sufficiently well in this country to produce good crops of bloom for more than one or two seasons.

BRAVOA. — A genus containing 4 species of perennial plants with tuberous rootstocks, and a few long lance-shaped or linear radical leaves, and red or whitish flowers in distant pairs. Perianth with a long rather cylindrical tube and short ovate or oblong nearly equal segments.

B. geminiflora (*Scarlet Twin Flower*). A graceful and distinct Mexican plant, growing wild at an elevation of about 7000 ft. It has a round tuber about 1½ in. in diameter, with very fibrous coats at the top, and pale green narrow sword-like leaves 12–18 in. long. The bright red or scarlet nodding tubular flowers about 1 in. long are produced from July onwards in distant pairs on erect stalks 1–2 ft. high.

Culture and Propagation. — This is the only species generally grown, and from the Thames Valley southwards may be regarded as practically hardy if grown in warm sheltered positions. In winter it is safer to protect the plants, especially in northern parts, from frost and cold rains. A rich sandy loam and leaf soil suit it best, and new plants may be obtained from the offsets in autumn or early spring, or by means of the seeds which should be sown as soon as ripe in cold frames, and grown on for a year before planting out.

AGAVE.—A genus of noble-looking plants with rosettes of fleshy sharp-pointed and often toothed leaves, and tall candelabra-like spikes of funnel-shaped greenish-yellow flowers, which, however, are rarely produced. The plants are not hardy, but *A. americana* and its variegated form are so well known that they require mention. They are large plants with rosettes of 30–40 or more fleshy sharp-pointed spiny toothed leaves 3–6 ft. long and 6–9 in. broad, glaucous-green, and more or less deeply channelled down the face, the outer leaves being recurved. The variegated form has broad white or pale yellow stripes from base to apex. As the leaves are unfolding from the centre it is curious to note the impression of their shape and spines on the inner leaves against which they have been pressed.

Culture and Propagation. — These plants are usually grown in large tubs or pots, and placed in more or less conspicuous positions in the garden from June to September, for the sake of their fine tropical appearance. In the winter they must be protected in a greenhouse. These large plants mature very slowly, and die after sending up a spike of flowers 20–40 ft. high.

Some species from the colder parts of N. America might be grown out of doors in the south of England and Ireland, but I fear our climate is too moist for them in winter. They can stand frost well in their native habitats, but not the raw cold moisture of the British Islands. Most of the kinds are easily increased by the offsets which spring from the base of the plants.

CXXIII. IRIDEÆ—Flag Order

An order of perennial herbs often with a woody, creeping, or stolon-bearing rootstock or rhizome, and usually smooth radical, equitant, flat linear or sword-like leaves in 2 rows, those of the stem alternate and sheathing. Flowers hermaphrodite, usually regular, borne on terminal bracteate spikes, umbels, corymbs, or panicles. Perianth superior, petal-like, with 6 lobes or segments, in two distinct circles, sometimes all nearly equal and alike, sometimes the inner ones larger or smaller and dissimilar to the outer ones. Stamens 3, opposite the outer lobes or segments of the perianth. Ovary inferior, usually 3-celled. Stigmas often petal-like. Fruit an ovoid oblong or rarely linear, sometimes 3-lobed capsule with few or many seeds.

IRIS (Flag).—A genus of ornamental herbaceous plants with a woody or fleshy creeping, or short spindle-shaped bulbous rootstock, and sword-shaped or linear often equitant leaves. Flowers in sheaths, often scattered on an erect scape or spike. Perianth tube short, with the 3 outer segments or 'falls' reflexed and often bearded at the base; the 3 inner ones or 'standards' erect, usually smaller than the others. Stamens 3, inserted at the base of the outer segments. Style triquetrous with 3 petal-like stigmas opposite and arching over the stamens. Capsule oblong, round, smooth, 3–6-ribbed, or distinctly triquetrous, 3-celled, many-seeded.

Owing to their beautiful and curiously constructed flowers, Irises have been rather appropriately called 'the Poor Man's Orchids.' The common German (*I. germanica*) and Florentine Flags (*I. florentina*) are to be met with in cottage gardens throughout the country, flourishing in almost any soil, and producing large numbers of flowers annually. But there are many others which may be grown quite as easily and are remarkable for the delicacy and beauty of colour exhibited by their flowers.

Broadly speaking, Irises may be roughly divided into four main groups, and as each group requires somewhat different treatment it may be as well to refer to each separately.

1. *Bearded Irises.*—This group, of which the common German Flag (*I. germanica*) is a well-known example, is readily recognised by its stout creeping rootstocks, sharp pointed sword-like leaves, and an erect scape with several flowers on it. Most of them have the 'falls' or outer petals distinctly and often beautifully bearded or crested at the base. They form a group of great beauty, and are perfectly hardy, vigorous, and free-flowering. They flourish in ordinary garden soil and require little attention. A partially shaded position is better than one fully exposed to the sun, as the flowers, which are naturally of a fleeting character, remain fresh for a longer period under partial shade than if scorched by the sun. All Irises with rhizomes or tuberous rootstocks may be easily increased in the autumn or early spring, simply by pulling or cutting the rhizomes to pieces, taking care that each portion has at least one eye or bud from which the new plant can develop.

2. *Beardless Irises.*—There is a rather large group of Irises characterised by the flowers having no beards or crests. They vary a good deal, and experience is the best guide to their successful cultivation. Some like a heavy loamy soil, others a mixture of peat and loam, and others again nearly all peat, or almost a boggy soil. Although some of them, like *I. aurea*, *I. unguicularis* (or *stylosa*), and *I. sibirica*, are fairly easy to grow well, others, like *I. douglasiana*, *I. tenax*, and *I. tectorum*, and such little-known kinds as *I. californica* and *I. Hartwegi*, are fastidious—sometimes flourishing with ordinary care, but at other times wasting away although every attention is bestowed upon them.

3. *Bulbous* or *Xiphion Irises.*—There are many beautiful rare and delicate species belonging to this group, the most common and best known being the so-called 'Spanish' and 'English' Irises. They are distinguished by having a roundish or spindle-shaped rootstock resembling a bulb in appearance, and by having often grassy or narrow leaves and flowers of great beauty and variety but generally smaller than those of the bearded and rhizomatous group. They all flourish in rich sandy well-drained soil and like warm sunny situations. They are best undisturbed for about 3 years, after which they may be lifted when the leaves have withered, and divided for the purpose of increasing the stock. They are far more effective in the flower garden when planted in masses than separately. Many of the choicer and rarer varieties are safest grown in pots, as they can be looked after more readily, and if necessary given the protection of a cold frame in winter.

Seeds are ripened by many Bulbous Irises in our climate, and it is always advisable in such cases to obtain a stock of plants from home-saved seeds, as their progeny is likely to prove much hardier and more amenable to our climate than plants from imported bulbs. The seeds should be sown as soon as thoroughly ripe in well-drained pots or pans in cold frames. By sowing thinly the seedlings need not be disturbed for the first year, so that they will have a fair chance of making good growth for the second year.

4. *Oncocyclus* or '*Cushion*' *Irises.*—These are usually the largest, most charming, and most beautifully coloured of all the Irises, but unfortunately they are also the most difficult to grow thoroughly well. According to Sir Michael Foster, F.R.S., who has devoted many years to the cultivation and study of these Irises, the characteristics of the group are as follows. In the rhizome the young bud, instead of being attached to the stock by a broad flattened base, and projecting slightly, stands out in the form of a nipple, the base of which is often constricted. In many forms the attachment is lengthened into a cord, often a very narrow one, so that the bud is at the end of a stolon. According to the narrowness and length (or the reverse) of the connection of the bud with the stock, the rhizome may be spoken of as more or less spreading or creeping, or more or less compact.

The foliage as compared with other Irises is scanty, and the leaves narrow, and mostly sickle-shaped. The flower stem or scape usually bears only a single flower, which is conspicuous by its size, colour and marking. The 'falls' are usually more or less bearded at the base, and occasionally there are also a few hairs on the claw of the standards. There is another group of Irises closely allied to the Oncocyclus, but as the flowers are somewhat different in shape, and more than one on a stem, they have been distinguished by Sir Michael Foster under the name of 'Regalia.' *I. Korolkowi* represents this section.

Notwithstanding the fact that Oncocyclus Irises are somewhat difficult to grow successfully, the great beauty and variety of form of their flowers will be an ample recompense for any special trouble taken with them. The main points in their cultivation are (1) shallow planting, (2) gritty well-drained soil, (3) non-disturbance in autumn, and (4) absence of wet overhead and at the root from the time the leaves wither until growth starts again naturally.

The Rev. H. Ewbank, of Ryde, I.W., who, as well as Sir Michael Foster and Herr Max Leichtlin of Baden-Baden, has devoted much attention to the cultivation of this group of Irises, has placed on record in 'The Garden' the method by which he has succeeded in growing them almost to perfection. He makes a raised bed some 6 inches or so above the surrounding soil, and uses road scrapings pure and simple in which to plant his Irises. This soil is light, rich, gritty, and easily penetrated. Moreover it cakes at the top and even in hot weather does not become dead dry if no glass be put over it. When the plants have finished flowering in early summer a light is placed over them, in such a way that there is free circulation of air. This protects the ripening plants from rain, and they can dry off in the soil without being disturbed. To insure a dry bottom, Mr. Ewbank placed about 1 ft. beneath the surface of the soil some paving stones, and thus prevented the ascent of moisture from the subsoil.

The best time to plant Oncocyclus Irises is the first week in June, and if the methods of Mr. Ewbank are adopted (or a modification of them, so long as the principle remains the same) there is every chance of securing success. With a dry well-drained bottom, the beds only require to be covered with a layer of straw or litter from the time of planting—say November 1st till about February 1st—simply to keep off excessive rains.

IRISES FROM SEEDS

Many of the Irises produce seeds freely in cultivation. If sown in light rich soil under glass, these will readily germinate. The seedlings may be pricked out and grown on, and about the end of the third year will be in a condition for producing flower. In the case of rare kinds, seeds should always be saved if possible and grown on in this way to increase the stock. Although Sir Michael Foster and Herr Max Leichtlin have both raised hybrid Irises, this group of plants has not yet been taken seriously in hand by professional gardeners. The Irises described in the following pages under the heads of *germanica*, *hybrida*, *pallida*, *neglecta*, *squalens*, and *variegata* are the chief ones among which any quantity of hybrid or cross-bred forms have appeared, and they constitute a very important and ornamental class of plants for the flower border. The various other kinds cross readily enough, and by cross-fertilisation many fine vigorous and hardy forms could no doubt be raised.

The following is a list of the best kinds of Irises met with in cultivation. They are arranged in alphabetical order, and not according to their natural groups (which will be indicated) for the sake of more easy reference.

In the following descriptions the word 'fall' is used to indicate the 3 outer segments, and the word 'standard' to indicate the 3 inner erect segments of the flower. Care must be taken to distinguish the latter from the 3 petal-like stigmas shielding the stamens in the centre of the flower.

I. **acutiloba.** — A distinct Caucasian Oncocyclus Iris with slender and distinctly creeping rootstocks and narrow slender leaves curved into a semicircle from stems an inch or two high. Falls about ½ in. broad, almost strap-shaped, with a sharply reflexed lance-shaped blade, pale lilac and dark purple with darker distinct veins, and a ridge of dense short dark purple or blackish hairs at the base; standards oblong, twice as broad as the falls, erect, with wavy edges, and of a pale lilac colour. This species varies in colour, and is very rarely met with.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. **alata** (*I. scorpioides; I. transtagana; I. trialata; I. microptera; Xiphion alatum*).—A very handsome bulbous Iris native of S. Europe and N. Africa, with lance-shaped pointed pale green distichous leaves about 1 ft. long. Flowers from October to December, with a cylindrical tube 3–6 in. long, and a bright lilac-purple limb about 3 in. deep; falls oblong, 1 in. broad, with bright yellow ridge at the base; standards somewhat spoon-shaped, 1 in. long, spreading horizontally.

This species varies a good deal in colour; hence several forms of it have received special names like *lilacina*, *speciosa*, *cinerea*, *nigrescens*, *cupreata*, *magna*, *Leichtlini*, *pallida* &c. There is also a white variety, *alba*.

Culture and Propagation. — This species grows mostly in winter, the leaves beginning to wither about April and May. In northern parts of the country for this reason it usually requires protection in winter, and is probably best grown in a cold frame.

Propagation is effected by detaching the small bulbs from the base of the larger ovoid ones when the plant is at rest. The small bulbs may be planted separately, but care should be taken not to injure the fleshy roots, although bulbs without them will grow.

I. **Alberti.** — A native of Turkestan, with a stout rootstock and sword-like slightly glaucous leaves 1½–2 ft. long. The large bright lilac flowers are produced in May and June, in loose panicles overtopping the leaves, having densely bearded falls veined with dull brown and lilac on a white ground.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **atrofusca.**—A beautiful Oncocylus Iris, native of Palestine. It grows about the same height has *I. susiana*, and has weak pale green or slightly glaucous leaves about a foot long. The large solitary flowers are borne at the top of a stout stalk a foot or so long, and are of a deep violet-purple colour. The wedge-shaped falls are about 3 in. long, 1½ in. broad, and of a deep almost blackish velvety purple, bearded at the base with brownish black and yellow hairs. The roundish standards are much larger, being about 4 in. long and 3 in. broad, and of a deep violet-purple distinctly veined with radiating lines and dots of a deeper colour.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. **atropurpurea.** — A Syrian species related to *I. iberica*, and like that in foliage. Flowers rather smaller with narrow ovate falls blotched and bearded with yellow at the base and tipped with dark purple or black; standards larger and roundish, deep black-purple, with veins of a deeper colour. Style reddish purple-brown with smallish quadrate crest. There is an improved Italian form called 'Odysseus.'

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. **aurea.**—A tall handsome beardless Himalayan Iris 3–4 ft. high, with stout stems bearing two sessile clusters of flowers, and having sword-like leaves about 2 ft. long. Flowers in June, bright golden-yellow; falls oblong, crisped at the edges; standards oblanceolate, shorter than the falls.

Culture &c. as above for 'Beardless Irises,' p. 917. This species grows well in ordinary soil and may be grown in groups in the border or shrubbery. Increased by dividing the rootstocks and by seeds.

I. **bakeriana.** — A pretty Armenian Iris with ovoid bulbs and cylindrical, 8-ribbed horny-pointed leaves about 1 ft. long. Flowers from January to March, very fragrant, having narrow oblanceolate standards of a sky-blue colour, and broader oblong spoon-shaped more or less erect 'falls,' white, blotched with deep blue or violet and edged with deep violet. The flowers vary a good deal in colour, and there is now a rare and beautiful white form.

Culture &c. as above for 'Bulbous Irises,' p. 917. This is a pretty plant for growing in pots in cold frames and greenhouses, and also in sheltered well-drained nooks in the rockery.

I. **balkana.** — A dwarf tufted species about 1 ft. high, native of the Balkan Mountains, with sharp-pointed sword-like leaves of a bluish-green tint. As a rule 2 flowers are borne on each scape, and are of dark purple-lilac colour, the fall having a dense white beard tipped with lilac.

Culture &c. as above for the 'Bearded Irises,' p. 917.

I. **Barnumæ.** — An Oncocyclus Iris, native of the hills of Kurdistan, with slender rootstock and stems only a few inches high. It comes near *I. iberica* but has narrower and less sickle-shaped leaves and smaller and less attractive dull wine-purple flowers, marked with deeper coloured veins and a brownish-yellow style blotched and spotted with reddish-purple. Falls smaller and narrower than the roundish standards and having a beard of yellow hairs tipped with purple. There is a charming yellow-flowered variety which emits a delicious fragrance not unlike that of Lily of the Valley.

Culture &c. See note above on the 'Oncocyclus Irises,' p. 918.

I. **Bartoni.** — A handsome species, native of Afghanistan, with pale green sword-like leaves about 18 in. long, and 1½–2 in. broad, strongly ribbed. Flowers in June, 2–3 in a cluster, strongly scented, having creamy-white falls veined with greenish-yellow, violet-purple on the claw, and a white and orange beard; standards creamy-white veined with purple.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **benacensis.** — A native of the Southern Tyrol 12–15 inches high, with sword-like leaves. The flowers are mostly in threes on the scapes, the upper ones being crowded. The long obovate falls are deep violet with still deeper veins, and end in a whitish claw veined with coppery violet, while the beard is white at the base and yellow above. The broad oblong standards are violet, as are also the triangular crests of the stigma.

Culture &c. as above for the 'Bearded Irises,' p. 917.

I. **biflora** (*I. fragrans; I. nudicaulis; I. subbiflora*). — A beautiful S. European Iris 9–18 in. high, with a stout short-creeping rootstock and rather glaucous sword-like leaves. Flowers in April, bright violet-purple; falls obovate, 1 in. broad, reflexed about midway, and having a yellow beard. Standards erect.

Culture &c. as above for 'Bearded Irises,' p. 917. Suitable for the border or rockery in ordinary garden soil.

I. **Biliotti.** — A handsome Iris of the *germanica* group, 2½–3 ft. high, native of Asia Minor. The leaves are of a darker green, stiffer, and more distinctly striped than those of *I. germanica*, and are over 20 in. long. The flowers are delightfully fragrant and appear rather later than those of *I. germanica*. The wedge-shaped spathulate falls are about 3½ in. long, reddish-purple with dark, almost black, veins and a white beard tipped with yellow. The standards are about 3½ in. long and 2 in. broad, bluish-purple with fine delicate deep blue veins. The obovate styles are white with triangular reddish-purple crests.

Culture &c. as for 'Bearded Irises,' p. 917. This species may be grown under exactly the same conditions as *I. germanica*. It is perfectly hardy.

I. **bismarckiana.** — A handsome and attractive Iris, native of Mount Lebanon, having creeping rootstocks and leaves like *I. susiana*, and flowers almost as large as in that species. Falls obovate with a convex blade, irregularly netted and veined with dark reddish purple-brown on a pale yellow ground, and bearded at the base with dark purple or blackish hairs. Standards roundish with bluntly serrate edges, veined with blue on a creamy-white ground. Style creamy-white spotted or blotched with reddish-brown.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. **Boissieri.** — A dwarf bulbous Iris about 1 ft. high, native of the Gerez Mountains in Spain, with linear deeply channelled leaves, ribbed on the outside. Flowers in June, solitary, 2–3 in. across, with fiddle-shaped horizontally spreading falls of rich red-purple, with a distinct golden-yellow bearded ridge; standards spoon-shaped, purple above, reddish below. Styles reddish-purple with darker veins.

Culture &c. as above for 'Bulbous Irises,' p. 917.

I. **bracteata.**—A distinct and interesting Iris, native of Oregon. It has solitary rigid leaves 1–2 ft. long, and about ½ in. broad, one side being green, the other glaucous. The angled flower stem is shorter than the leaves, and furnished with purple sheathing bracts. The large, almost pure yellow flowers have oblong lance-shaped falls veined with bluish-purple, the standards being narrow and lance-shaped. As a rule, the body colour changes to white and the veins to deep rose with age.

Culture &c. as above for 'Bearded Irises,' p. 917. This species likes warm positions, and may be increased by dividing the slender rhizomes.

I. **caucasica.** — A bulbous Iris, native of the Caucasus to Persia, about 6 in. high, with 4–6 lance-shaped sickle-like leaves. Flowers in February and March, 2–3 in. across, pale yellow ; falls obovate, ½ in. broad, reflexed at the upper portion ; stigmas broad, pale yellow, with deltoid crests. Standards minute, spoon-shaped, pointed. The variety *major* is larger in all its parts, the ridge of the falls being of a deeper or orange-yellow, toothed or even fringed with hair-like processes; the variety *Kharput* has about 5 flowers sessile in the axils of the upper leaves, greenish-yellow, except the central orange ridge of the falls. The standards are larger than in the type, bent vertically downwards, with edges sharply curled to form a channel. *I. assyriaca*, with white flowers, closely resembles *I. caucasica.*

Culture &c. as above for 'Bulbous Irises,' p. 917. *I. caucasica* and its varieties are of more interest perhaps from a botanical than a garden point of view.

I. **Cengialti.**—A pretty Iris from Mt. Cengialto, having yellow-green leaves 6–9 in. long and about ½ in. broad. Flowers in May and June, 1–4 on a stem about 1 ft. high, sky-blue flushed with violet, the falls having a thick stunted white beard tipped with orange. The variety *Loppio* differs from the type in having blue-green leaves, and rich deep blue flowers with somewhat longer and narrower segments.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **Chamæiris.** — A pretty S. European species 4–6 in. high with tufts of pale green leaves about ½ in. broad. Flowers in April, with oblong spoon-shaped falls ¾ in. broad, bright yellow tinged and veined with brown, and having a bright orange-yellow beard. Standards primrose-yellow, crisped at the edges. The variety *balkana* is a taller and more handsome plant with bright lilac-purple flowers; *olbiensis* has the falls white at the base, veined with purple, bearded with white and tipped with yellow.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **cretensis.** — A stemless species native of S.E. Europe, with dense tufts of erect stiffish narrow linear ribbed leaves, in the centre of which the deep lilac flowers nestle in April and May. Falls obovate, clawed, beardless, about ¾ in. broad, standards much narrower.

Culture &c. as above for 'Beardless Irises,' p. 917.

I. **cristata.** — A handsome slender species 4–6 in. high, native of the Eastern United States, with distichous rosettes of linear leaves. Flowers in April and May, rich amethyst-blue, with blunt obovate falls having a yellow beardless crest, and beautifully fringed edges. This is a charming plant for sunny sheltered banks or parts of the rockery where it will not be too wet in winter.

Culture &c. as above for 'Beardless Irises,' p. 917.

I. **Danfordiæ** (*I. Bornmülleri*).—A charming little bulbous Iris about 3 in. high, with 4-sided horny-pointed leaves. Flowers in February, sometimes earlier, bright golden-yellow spotted with brown; falls oblong, spoon-shaped; standards reduced to a mere bristle.

Culture &c. as above for *I. bakeriana* and 'Bulbous Irises' generally, p. 917. Grows well in dry corners of the rockery.

I. **douglasiana.**—A slender Californian species 6–12 in. high with tufts of thick stiffish strongly ribbed linear leaves. Flowers in June, soft yellow, 1½–2 in. deep; falls obovate, spoon-shaped, handsomely veined with bright lilac-purple; standards shorter, erect.

Culture &c. as above for the 'Beardless Irises,' p. 917.

I. **Duthiei.**—A native of N. India (Kumaon) with knotty and gnarled rhizomes and tufts of yellowish-green leaves about 2 ft. long and ½ in. broad. The solitary sessile flowers appear in May when the leaves are only 2–3 in. long, the full growth of the leaves not being finished till about the end of June. The nearly horizontal lance-shaped falls are reddish-lilac above, with darker veins and blotches, and a white beard tipped with yellow at the base; greenish-yellow beneath, with the veins and blotches showing through. The oblong ovate standards are about 1¼ in. long, pale reddish-lilac with darker veins, while the styles with triangular crenate crests are of a similar colour.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **Eulefeldi.**—A native of Eastern Turkestan, about 1 ft. high, with remarkably glaucous, sickle-shaped leaves 1 ft. or more long. Flowers in May and June, 2 on a stem, reddish-purple; falls purple with a long white and bluish-purple beard; standards purple and reddish-purple, with a yellowish claw.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **filifolia** (*Xiphion filifolium*).—A native of S. Spain and N. Africa, resembling *I. Xiphium* in bulb and foliage, and having slender roundish stems, 12–18 in. high, with 6 or more filiform leaves, over a foot long, the outer ones mottled with purple. Flowers about the end of June, bright deep purple, spotted with black, and having a patch of orange on the blade of the large oblong, fiddle-shaped fall.

Culture &c. as above for the 'Bulbous Irises,' p. 917. May be grown in ordinary garden soil in warm sheltered spots.

I. **flavescens.**—A native of E. Europe and W. Asia, 2–3 ft. high, with the habit and foliage of *I. germanica*. Flowers in May, lemon-yellow, about 2 in. deep; falls obovate wedge-shaped, about 1½ in. broad, bearded with orange-yellow and veined at the base with purple-brown; standards erect, obovate.

Culture &c. as above for the 'Bearded Irises,' p. 917. Increased by division and seeds.

I. **florentina** (*Florentine Iris*).—A splendid and well-known S. European species, with thick, fleshy, creeping rootstocks, tufts of glaucous sword-like leaves, and flattish flower stems, 2–3 ft. high. Flowers in May and June, 3–6 in. deep, whitish, tinged with pale lavender, and having a bright yellow beard on the falls. The flowers exhale a sweet odour like that of Violets, and in the variety *albicans* are almost pure white.

Culture &c. as above for the 'Bearded Irises,' p. 917, and *I. germanica*.

I. **fœtidissima** (*Fetid Gladwin; Roast Beef Plant*).—A beautiful British species, with somewhat flattened flower-stems, 2–3 ft. high, and firm, deep green, sword-shaped leaves. Flowers from May to July, usually purple, or bluish-lilac, 2–3 in. deep. There is a variety with pretty variegated foliage, striped with ivory-white lines, which looks particularly handsome in spring.

Culture &c. as above for the 'Beardless Irises,' p. 917. The Gladwin flourishes in moist and partially shaded places in ordinary garden soil, and in the autumn is rendered remarkable by its bursted pods of orange-scarlet seeds.

I. **fosteriana.**—A pretty bulbous Iris, about 1 ft. high, native of Afghanistan, with slender elongated bulbs, having fleshy roots and linear leaves, not unlike those of the Spanish Iris (*I. Xiphium*), but much striped on the outside. Flowers in March, about 2 in. across, with yellow falls and styles, but reddish-purple standards.

Culture &c. as above for 'Bulbous Irises,' p. 917. This species is very difficult to grow; according to Sir M. Foster a moderately stiff soil suits it best. It should be kept as dry as possible in winter, and hot in summer. It must be sheltered from winds and kept free from the roots of trees and shrubs.

I. fulva.—A United States Flag, 2–3 ft. high, with bright green, narrow, sword-shaped leaves. Flowers in June, bright coppery brown, 2–3 in. deep, the oblong clawed falls having a reddish-brown down on the keel.

Culture &c. as above for 'Beardless Irises,' p. 917. Increased by division of the rootstocks. Grows well in ordinary soil in moist situations near lakes, ponds &c.

I. fumosa (*Xiphion Aucheri*).—A Syrian species related to *I. sindjarensis*, from which it differs in having shorter and relatively broader leaves, and in the stem bearing 8–10 greenish-yellow flowers, with a more or less smoky tint, in April. Scarcely ornamental enough for the flower garden, but interesting in botanical collections.

Culture &c. as above for 'Bulbous Irises,' p. 917. This species is also known as *I. cuprea.*

I. Gatesi.—A handsome Oncocyclus Iris, native of Armenia, resembling *I. susiana*, but having a more compact rhizome, and shorter, narrower, and deeper green foliage. The flower stem is taller, 1½–2 ft., and the individual blooms (which appear in June) larger, of a soft delicate grey—the result of very thin clear veins and minute purple dots on a creamy-white ground, the dots predominating on the curved convex fall 4 in. across, and the veins on the large roundish standard 5 in. or more across. The hairs on the claw beneath the grey or brownish style flecked with dark purple are crowded into a diffuse beard. The ripe capsule is often 5 in. long. As the flowers do not stand even gentle winds well, the plants should be sheltered as much as possible.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. germanica (*Common* or *German Flag*).—This well-known and ornamental Iris from Central and S. Europe is more generally cultivated than any other. It has a thick fleshy creeping rootstock, tufts of glaucous sword-like leaves, and flower stems 2–3 ft. high, bearing many large fragrant and elegant purple and lilac blossoms in May and June; the falls have a conspicuous yellow beard on a whitish ground veined with brown.

Culture and Propagation.—This species flourishes in ordinary soil, and in any situation, but prefers partially shaded to very sunny spots as the flowers retain their freshness for a longer period. There are many forms cultivated in gardens, all beautiful and easily grown, the best being *alba*, white; *atropurpurea*, deep reddish-purple; *grisea*, white veined and netted with lilac; *major*, large, blue and purple; *Agnes*, pale lavender and blue; *Arlequin*, brown and black; *Argus*, violet; *Calypso*, white streaked with purple; *Canary Bird*, yellow; *Laura*, pale yellow and deep purple; *Lucretia*, porcelain, striped purple; *Othello*, yellow and violet; *Sappho*, golden-yellow and bright blue &c. They are all easily increased in early autumn or early spring by dividing the rootstocks and replanting and watering into rich garden soil. There is a form of the German Iris called *nepalensis*, but it must not be confounded with the bulbous *Iris nepalensis*, a quite distinct plant described below, p. 927.

I. graminea.—A pretty beardless Iris, native of Central and Southern Europe, with solid 2-edged stems about 9 in. high, and tufts of linear grassy leaves 12–18 in. long, and much overtopping the flowers. The latter are slightly fragrant, and produced in May and June, bright lilac-purple in colour, 1½–2 in. deep, the roundish falls being veined with bluish-purple on a white ground.

Culture &c. as above for 'Beardless Irises,' p. 917. This species likes a rich moist soil in warm situations, and may be increased by division. There are a few varieties in cultivation, such as *lamprophylla* and *latifolia.*

I. Grant-Duffi.—A pretty species, native of the Holy Land, recognised by its bluish glaucous-green leaves and sulphur-yellow flowers.

Culture &c. as above for the 'Bearded Irises,' p. 917. It is easily grown in ordinary soil, and may be treated in the same way as the common German Flag.

I. guldenstadtiana (*I. halophila* (*Pallas*); *I. stenogyne*).—A beardless Iris native of Siberia with stout flower stems about two ft. high, and firm sharp-pointed sword-like leaves. Flowers in June, 2 in. deep; falls white with an orange base;

standards pure white with a yellow keel and margin. There is an almost pure white variety, *alba*, and a blue one called *cœrulea*.

Culture &c. as above for 'Beardless Irises,' p. 917. Ordinary garden soil. Increased by division of the rhizomes.

I. **Helenæ.**—A lovely Caucasian Iris, with large flowers having bright lilac standards, and purple falls veined with black, and having a velvety black blotch at the base. This may be a form of *I. iberica.*

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. **hexagona.**—A native of the South United States with deeply forked leafy stems, 3–4 ft. high, and sword-shaped leaves 2–3 ft. long and over an inch wide. Flowers in April and May, 3–4 in. deep, pale or deep lilac, with spoon-shaped standards and obovate clawed falls. Closely related to this species is the Japanese *I. albo-purpurea*, which has white flowers spotted with purple.

Culture &c. as above for 'Bearded Irises,' p. 917. Ordinary soil. Increased by division.

I. **heylandiana.** — A rare Oncocyclus Iris, native of Mesopotamia. It is near *I. Sari*, but the foliage is somewhat narrower, and the flower stem more completely clothed with clasping leaves. Both fall and standard are marked with brown-violet or black-purple veins, on a dingy white ground, the purple hue not being so prominent as in *I. Sari*, and the white ground coming more to the front. The beard on the fall is white, more or less tinged with yellow.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. **hookeriana.**—A Bengalese Iris with rather fleshy rhizomes and yellowish-green leaves about a foot long and nearly an inch broad appearing with the flowers. The flower stems are shorter than the leaves, and bear two flowers. Falls obovate lance-shaped, 1¾ in. long, densely bearded with white hairs tipped with orange, and bluish-purple with darker blotches. The narrow obovate standards about ¾ in. long are bluish-purple, while the concave styles with triangular serrate crests are reddish-purple.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **hybrida** (*I. amœna*).—Under this name come a large number of garden Irises which have been derived probably by hybridising and cross-breeding *I. germanica*, *I. variegata*, *I. squalens*, and other species. The sword-like leaves are a foot or more long. The large flowers appear in June, and usually have whitish, pale lilac, and generally pale coloured standards, and deeper coloured falls (lilac, purple &c.) with a bright yellow beard on a white ground, and variously blotched and striped.

Culture &c. as above for 'Bearded Irises,' p. 917. These hybrid or garden Irises are among the showiest and most easily grown plants. They are perfectly hardy, with a vigorous constitution capable of resisting wet or drought, and produce large numbers of blossoms, comprising all shades of blue, lilac, violet, yellow and brown, and passing from pure white to the deepest purple. For the decoration of beds and borders, margins of shrubberies, edges of lakes, ponds &c. they are unequalled when in bloom.

I. **iberica.** — A strikingly handsome Oncocyclus Iris, native of the Caucasus, with a compact rhizome and sickle-shaped leaves 4–6 in. long. Flowers in May, 5–6 in. deep, with large broad incurved standards, pale lilac in colour, distinctly lined and speckled with purple; falls roundish creamy-white with black-purple blotches and a conspicuous deep velvety blackish-purple blotch at the base. There is a good deal of variation in the colour of the flowers, but all forms are very handsome. That known as *ochracea* has rich orange falls tinged with brown, and standards nearly pure white. *Belli* has dark lilac standards. Sir Michael Foster mentions a charming variety in which the standards are a pure dead white with only a few hardly visible black-purple spots around the base of the claw; the fall is marked with a thick irregular network of chocolate-brown, while the 'signal' or patch at the base is deep crimson, the style being almost black. The form known as *Van Houttei* is a natural hybrid between *I. iberica* and *I. susiana* and has been reproduced artificially by Sir M. Foster, who has also succeeded in obtaining hybrids between *I. iberica* and *paradoxa*, *lupina*, *Meda*, *Chamæiris &c.* *I. iberica* and its forms are grown to perfection by that veteran horticulturist, Mr. Geo. F. Wilson, of Weybridge.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. **juncea** (*I. imberbis; I. mauritanica*).—A graceful bulbous Iris, native of S. Italy and Spain, and N. Africa, with roundish bulbs and slender rush-like leaves about 1 ft. long, appearing late in autumn. Flowers in June and July, very fragrant, and of a rich golden-yellow; the falls are broadly fiddle-shaped, and much larger than the oblanceolate notched standards. The variety *pallida* is a soft canary-yellow, and *numidica* is lemon-coloured.

Culture &c. as above for 'Bulbous Irises,' p. 917. This species and its varieties are best grown in rich light soil in warm dry situations. The flowers are excellent for cutting, and valuable on account of their delicious fragrance.

I. **kolpakowskyana.** — A pretty Iris from Turkestan, with round netted bulbs and linear channelled leaves thickened at the edges. Flowers in March, fragrant, the oblong lance-shaped falls presenting a beautiful contrast of rich red-purple and bright golden-yellow with broken purple veins, the oblong standards being pale lilac or purple.

Culture &c. as above recommended for 'Bulbous Irises,' p. 917. This is a very difficult Iris to grow, as the imported bulbs mostly die after the first year. Perhaps if treated like the Oncocyclus Irises (p. 918) there would be a chance of success.

I. **Korolkowi.**—A native of Turkestan 1-1½ ft. high, with linear glaucous leaves and large whitish flowers tinged with brown and copiously veined with a deeper colour; falls oblong, bearded; standards rather broader, erect. The variety *concolor* has beautiful bright lilac-purple flowers; *leichtliniana* has handsome creamy-white flowers marked with a blackish-purple blotch at the base of the falls; *venosa* has greyish-lilac flowers distinctly veined with purple; and *violacea* violet or puce-coloured flowers with darker veins.

Culture &c. as above for 'Bulbous Irises,' p. 917. Grows best in light warm and dryish soil, and should be protected from wet in winter.

I. **kumaonensis** (*I. kingiana; I. longifolia; I. tigrina*). — A native of the Western Himalayas, at an elevation of about 11,500 ft. It has stout short creeping rootstocks and tufts of leaves 6-9 in. long, and about ½ in. broad. Flowers in May, 2-3 in. deep, with dark lilac falls, mottled with paler lilac and having a white and yellow beard, standards paler in colour.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **lacustris.** — A beautiful and free-growing N. American Iris with creeping rootstocks and charming sky-blue flowers produced in early spring, and often again in autumn.

Culture and Propagation.—It flourishes in sandy soil in open sunny situations, and may be increased by division in autumn or spring.

I. **lævigata** (*I. Kæmpferi*).—*Japanese Iris.*—This remarkable species, native of Siberia and Japan, has the largest flowers in the genus, and is better known in gardens under the name of *I. Kæmpferi.* It grows about 2 ft. high, with solid glaucous flower stems, and pale green weakish sword-shaped leaves. The blooms which appear in June and July are very variable in size and colour, sometimes measuring 8-10 in. across. In the wild type the large roundish falls are violet-blue, with a bright yellow blotch at the base, and the much smaller oblong obovate standards are usually of a much paler blue. There are in cultivation, however, a great number of varieties with pure white, lilac, magenta, purple, and other shades of colour, all more or less constant in the yellow blotch at the base of the falls. There are varieties in which the colour becomes streaked or blotched, but they are not so ornamental as those with a clear uniform colour. There are also double-flowered forms not so desirable as the others.

Culture and Propagation.—*I. lævigata* and its varieties are not difficult to grow. They rejoice in a moist peaty loam, although in a wild state they are found in boggy and even slightly submerged soils. Warm, sunny, or not too shady positions by the banks of streams, lakes, ponds &c. suit the plants perhaps better than any other, and when grown in large masses they are very effective. The plants may be increased by careful division of the rootstocks in autumn. Seeds may also be saved and sown in early spring in pots or pans in cold frames. The young plants may be transplanted to their permanent positions about September, and will flower the following year. From seeds most of the fine forms in cultivation have been derived. After flowering the stems should be cut down immediately (unless seeds are required) so as to throw all the vigour to the plants for next season. Every spring a large number of rootstocks of this species are imported direct from Japan, and find a more or less ready sale.

I. Leichtlini (*I. vaga*).—A pretty species, native of Turkestan, with creeping rootstocks and erect slender sharp-pointed narrow sword-like leaves. Flowers yellowish, purple and brownish-red, with broadly lance-shaped standards, and obovate spoon-shaped falls having a bluish-white beard.

Culture &c. as above for 'Bearded Irises,' p. 917. Ordinary garden soil. Increased by division.

I. longipetala.—A Californian species 2–3 ft. high, with narrow sword-like leaves 12–18 in. long. Flowers in June and July, 2–3 in. deep, bright lilac, with obovate falls, having a bright yellow keel and violet veins on a white ground.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. Lorteti.—A very handsome Oncocyclus Iris, native of S. Lebanon, resembling *I. Sari*, *I. Gatesi*, and *I. susiana*, with sword-shaped leaves and very large flowers, very variable in colour. The standards are pale pink or delicate rose veined with purple, the falls being pale blue or lavender covered with crimson spots, and a deep crimson or blackish-purple blotch at the base. Other forms may have creamy-yellow falls heavily spotted with purple, and almost pure white or pale violet standards distinctly but very thinly veined with violet.

Culture &c. as above for 'Oncocyclus Irises,' p. 918. When well grown this is a most attractive Iris, and its inclination to vary a good deal in colour is a great point in its favour from a garden point of view.

I. lupina (*Wolf's Ear Iris*).—A very distinct and handsome Oncocyclus Iris, native of Armenia and Central Asia Minor, intermediate between *I. iberica* and *I. susiana*. It has compact rhizomes and somewhat variable sickle-like leaves about 9 in. long. Flowers in May and June, borne singly on stems 2–6 in. high, with a very distinct colour, the result of brownish-red veins on a creamy-yellow or greenish-yellow ground, the red of the veins often merging into deep dark purple, the broad lance-shaped falls having a triangular blotch of very dark, almost blackish-purple in front of a diffuse yellow beard at the base. The broad elliptic standards are usually much deeper in colour than the falls, and there is a good deal of variation in the ground colour, it being sometimes nearly a pure bright yellow.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. lutescens.—A South European Iris with slightly glaucous sword-like leaves, and large handsome flowers produced in May on round glaucous unbranched stems. Falls pale yellow, tinged and veined with purple-brown, and having a bright yellow beard; standards broader, primrose-yellow, suddenly narrowed to a claw. The variety *Statellæ* is a handsome plant about 1 ft. high, with pale yellowish flowers veined with green, and bearded with bright yellow.

Culture &c. as above for 'Bearded Irises,' p. 917. Ordinary garden soil. Increased by division.

I. Mariæ.—A pretty Oncocyclus Iris about 6 inches high, from Egypt and Palestine, having rather slender compact rhizomes and foliage like that of *I. iberica* but narrower and less distinctly sickle-shaped. The flowers are smaller than those of *I. iberica*, and of a uniform lilac colour, marked with deeper coloured veins and having a deep, dark purple blotch at the base of the fall, the claw of which is beset with deep purple hairs crowded in the middle. This species was first called *Helenæ*, but that name had been previously given to another plant from the Caucasus referred to above.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. Meda.—A handsome Persian Iris of the Oncocyclus group with small slender compact rhizomes, and very narrow erect —not sickle-shaped—leaves. The flowers in the typical species have pale lilac, narrow pointed falls with a dense yellow beard and a deep purple blotch at the base, while the standards are of a paler lilac colour. The colour in cultivated specimens varies somewhat, and it is not unusual to meet with flowers having a greenish-yellow ground, the falls having thick purple veins, and the standards brown ones, while the style is spotted with brown.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. **Milesi.**—A Himalayan species about 3 ft. high with pale green, tapering, sword-shaped leaves 1½–2 ft. long, and three or four clusters of large bright lilac flowers borne in May and June on stems about 3 ft. high, the falls having deeper lilac veins radiating from the yellow base.

Culture &c. as above for 'Bearded Irises,' p. 917. This species flourishes in light rich soil in warm sheltered spots.

I. **missouriensis** (*I. tolmieana*).—An attractive Iris, native of the Rocky Mountains, with tufts of linear tapering leaves about 1 ft. long. Flowers in May, large, pale bluish-lilac veined with purple, the falls being faintly stained with yellow towards the base.

Culture &c. as above for 'Beardless Irises,' p. 917. Grows well in good garden soil, and is useful for cutting.

I. **Monnieri.**—A large and handsome beardless Iris, native of Crete, with erect lance-shaped leaves about 2 ft. long. Flowers in June and July, in clusters on stout roundish stems 3–4 ft. high, emitting a sweet fragrance and being bright lemon-yellow in colour, the roundish falls being sometimes edged with white.

Culture and Propagation. — This species flourishes in moist situations near ponds, streams, lakes &c., and may be easily increased by division or seeds.

I. **neglecta.** — A handsome Iris of unknown origin belonging to the *germanica* group. The sword-like leaves are somewhat glaucous, purple at the base, and 12–18 in. long. The flowers 2–3 in. deep appear in June on branched stems 1½–2 ft. high, and have bright lilac or deep blue falls veined with purple-red on a whitish ground and bearded with bright yellow, the standards being pale lilac. Many fine garden forms of this are to be met with, having various shades of lavender, violet, blue, and white, among the best being *Alice*, *Alvarez*, *Caméléon*, *La Gracieuse*, *Prince Arthur*, and *Shirley Hibberd*, although names are really of little consequence.

Culture &c. as above for 'Bearded Irises,' p. 917. May be grown and increased like *I. germanica*.

I. **nepalensis** (*I. decora*).—A distinct Iris 6–12 in. high, native of the mountains of Nepaul, with small rhizomes covered by a net of fibres, and having white fleshy thong-like roots, and linear sword-shaped, tapering, striped leaves, attaining their full length after the blooms are over. Flowers 1½–2 in. deep, of a delicate pale lavender, due to thin violet veins on a creamy-white ground, the lanceolate spoon-shaped falls having a median ridge of yellow hairs towards the base. The flowers are very fleeting; they open in the morning and are over before evening, and as they are not produced in great abundance this species is not likely to become a popular garden plant. Moreover it requires careful treatment, says Sir M. Foster. It has to be supplied with plenty of moisture during the summer and kept very dry during the winter. The roots are best left in the ground to ripen, and if they can be treated somewhat as recommended for the Oncocyclus group, would probably give good results. The variety *Letha* from the Chin Hills in Upper Burmah is a better garden plant. It scarcely differs from the type except in having sessile and deliciously fragrant flowers, produced in June and in greater abundance, and of a delicate lavender colour, nestling at the base of a tuft of short green leaves. It should be protected from wet in late autumn to help it to ripen, but afterwards except for a slight mulching of litter on top will stand the winter very well.

Culture &c. as above, p. 917.

I. **ochroleuca** (*I. gigantea*).—A splendid beardless Iris of unknown origin, but long cultivated in gardens. It has slender sword-like leaves about 4 ft. long, and flower stems often 6 ft. high bearing clusters of large ivory-white flowers in June, the roundish-obovate falls having a large yellow blotch at the base.

Culture and Propagation.—There are several forms of this species, some with larger flowers than others. They are all easily grown in ordinary garden soil in moist or dry places, and are effective in borders and shrubberies when in good masses. Increased by division.

I. **orchioides** (*Orchid Iris*).—A very distinct bulbous Iris found wild in

Western Turkestan and Bokhara, remarkable for its very large bulbs, sometimes as large as a goose's egg. The flowers, 2–3 in. across, are borne in March and April all along the stems, which are 1½–2 ft. high, and are bare in the internodes between the clasping glossy green leaves, narrower and less horny on the margins than those of *I. caucasica*, to which this species is related. They are of a rich dazzling yellow, with or without a greenish tint or spot, the oblong reflexed falls being variously spotted, blotched, and veined with violet.

The variety *cærulea* has pale blue or lavender flowers, the ridge of the fall being yellow with lavender blotches, the whole blade being sometimes creamy-yellow. In the variety *oculata* the yellow flowers have blue blotches on the fall, and *linifolia* has yellow flowers and extremely narrow leaves.

Culture &c. as above for 'Bulbous Irises,' p. 917. *I. orchioides* flourishes best in a rich stiffish rather than sandy loam, in warm sunny positions, and seems to be perfectly hardy.

I. **pallida.**—A splendid Flag of the *germanica* type, native of the Mediterranean region, having tufts of sword-shaped leaves 12–18 in. long. Flowers in June, on stems 2–3 ft. high, emitting a sweet fragrance like that of orange-blossom, and varying in colour from bright slaty-lilac to deep lilac-purple, the falls having a bright yellow beard towards the base, which is veined with bright lilac on a white ground. There are several fine garden forms of this species having various shades of lilac and purple flowers, among the best varieties being *australis*, *Celeste*, *Cypriana*, *dalmatica*, and *Queen of May*. They are all effective, especially when in bold masses, and are readily increased by division.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **paradoxa.**—A singular Oncocyclus Iris, native of Western Persia and the Caucasus, having slender compact rhizomes and few narrow short more or less sickle-shaped leaves. The specific name *paradoxa* alludes to the great disproportion between the small strap-shaped stout and almost leathery fall, half an inch or less wide, spreading horizontally and ending in a rounded apex, while the standard is large roundish and erect, and delicate and flimsy in texture. In the typical species the standard is veined with deep violet or bluish-violet, the intervening spaces being of a paler tint. Over the claw of the standard and along a median streak the colour is creamy-white, densely dotted with violet. The style is brownish-yellow with lines of dark purple spots. Like other species this varies a good deal in size and colour, some varieties having white or red-purple standards, the general effect being very attractive.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. **persica** (*I. bulbosa persica ; Xiphion persicum*).—A charming little bulbous Iris, native of Persia and the more southern parts of Eastern and Central Asia Minor, sometimes with ovoid bulbs as large as a hen's egg, and linear lance-shaped, tapering, more or less arched leaves. Flowers in February and March, 2–3 in. across, violet-scented, usually borne singly on the scarcely visible stem, but occasionally 2–3 flowers at a time. The oblong spoon-shaped wavy falls are of a pale bluish-green or whitish colour with a conspicuous and beardless bright yellow keel, in front of which are blotches and spots of deep almost black violet. The variety *purpurea* is almost entirely of a dark reddish-purple colour with an orange ridge on the fall, and a deeper tint in front. Other varieties are light purple, almost lavender, yellowish-lilac, sea-green &c., but all have a conspicuous patch of deep purple-violet or even black in front of the orange or yellow keel. Differing from all ordinary varieties of *I. persica* is one named *Isaacsoni* by Sir Michael Foster. This variety is characterised by having extremely sickle-like leaves with horny ridges. The fall is creamy-white in front tinged with green and broken by thick violet veins which, running parallel to the median violet-dotted yellow streak on the claw, form a conspicuous violet zone around the ridge on the blade. There is no patch of deep colour in front as in the other forms.

Culture and Propagation.—*I. persica* and its varieties, although perfectly hardy, require mild warmth when blooming, and after growth is finished the plants require to be ripened by heat and drought. A stiffish loamy soil seems to suit them better than a sandy peat as usually recommended, and also warm sunny situations sheltered from bleak winds. In wet districts the bulbs are probably best lifted every year when thoroughly ripened, and if seeds are saved they should be sown at once in pots under glass.

I. plicata.—A plant of unknown origin 2–3 ft. high, with slightly glaucous sword-like leaves 12–18 in. long, and clusters of large fragrant flowers produced in June and July; falls obovate, pure white in the centre, veined with bright lilac at the edges, and having a yellow-tipped beard; standards obovate-oblong, plaited, pure white edged with lilac.

Culture &c. as above for 'Bearded Irises,' p. 917. Ordinary garden soil. May be grown like *germanica*, *hybrida*, and *neglecta*.

I. Pseudacorus (*Yellow Flag* or *Water Flag*).—A well-known British species found near river banks, ditches &c., having a stout creeping rootstock, and glaucous sword-shaped leaves 2–4 ft. long. Flowers from May to August, large, almost scentless, 3–4 in. across, bright yellow with a deeper spot at the base of the falls which are veined with brown or purple. The variety *acoroides* from N. America has smaller sulphur-yellow flowers than the type. There is a beautiful variety in which the leaves are striped with ivory-white, as in a form of *I. fœtidissima*, and another with golden-yellow stripes, but these are much clearer and finer looking in spring than in summer and autumn, by which time they have usually disappeared.

Culture and Propagation. — Any moist shady place will suit the Yellow Flags, which are easily increased by dividing the roots in autumn or spring.

I. pumila.—A charming little Iris 4–5 in. high, from S. Europe and Asia Minor, with tufts of slightly glaucous sword-shaped leaves. Flowers in April and frequently a second time in autumn, borne singly on the stems, and of a bright lilac-purple or deep violet colour, the reflexed falls having a dense white beard at the base, the standards being usually paler in colour. There are several forms of this Iris, among which may be mentioned *albida* — the Crimean Iris — greyish-white; *atro-cærulea*, deep purple; *attica*, yellow veined with brownish-lilac; *cærulea*, bright blue with yellow beards; *cælestis*, sky-blue; *gracilis*, pure white with bronze falls; and *lutescens*, bright yellow.

Culture and Propagation.—*I. pumila* and its varieties make excellent edgings for borders on account of their bright colours in spring, used mixed or in separate colours, but the best effects are from alternate colours. For banks, slopes, and parts of the rockery they are also valuable, and flourish in light free soil. They may be increased by division.

I. reticulata (*Netted Iris*).—A charming Caucasian Iris having ovoid bulbs with netted coats and 4-sided horny-pointed narrow leaves about 1 ft. long when fully developed. Flowers in February and March, sometimes even in January when the snow is on the ground, and the leaves are only a few inches high, deep violet and sweetly scented, the long narrow falls having a bright golden or orange patch at the base and forming a striking contrast to the deep violet.

There are many beautiful forms of the Netted Iris, the most distinct being the following:—

(1) *Cyanea*, a beautiful dwarf-growing variety with flower stems scarcely raised above the surface of the soil. It has attractive bright blue flowers which should be protected with a handlight or a sheet of glass, as they are easily injured by the cold rains.

(2) *Histrio*, a charming variety, in which the leaves are 1 ft. or more long, when the flowers open from December to March; they are bright blue blotched with golden-yellow and having deep purple blotches on the blade of the falls.

(3) *Histrioides* opens its flowers before the leaves appear, and these are eventually stouter and longer than in any other form of *I. reticulata*. The flowers are 4–5 in. across, usually of a bright blue, sometimes assuming a light violet tint; the ridge of the fall is golden-yellow with a white or creamy zone outside veined and blotched with violet. In warm situations the flowers possess a distinct fragrance.

(4) *Humilis.*—The flowers which in some respects resemble those of *I. bakeriana* appear when the leaves are a few inches high and are of a rich red-purple colour, the fall having a bright orange or yellow ridge surrounded by a zone of dense creamy-white broken up by dots and veins of deep purple.

(5) *Krelagei.* — This flowers rather

earlier than the type; the plants vary a good deal and the blooms are sometimes sweet-scented, and of a more or less deep claret-purple colour with golden-yellow ridges to the falls.

(6) *Purpurea.*—This flowers about the same time as *Krelagei* when the leaves are 2–8 in. long, and is of a fine deep reddish-purple, the blade of the falls being particularly dark, and thus forming a striking contrast with the yellow ridge.

(7) *Sophenensis.*—The flowers appear after those of the variety *Histrio* and before those of *Krelagei*, and vary in colour from a dark red-purple to a blue-purple, or to a lilac or lavender, the whole having a peculiar metallic sheen, and the orange ridge on the falls is continued unevenly along the entire length.

Besides the above forms of *reticulata* which are distinct not only in colour but also in the shape of the floral segments, there is also a seedling form called *major* or *cærulea* having various shades of pale blue; and there are several other variations scarcely meriting distinctive names.

Culture and Propagation.—*I. reticulata* and its varieties flourish in a light free soil in warm sunny and sheltered situations. When thoroughly ripened the bulbs may be lifted and stored; otherwise, and especially in wet seasons, they are apt to rot or become diseased in the soil. Three or four bulbs in a 5 in. pot grown in a cold frame or greenhouse make a beautiful picture. When grown outside, owing to the flowers appearing at an unfavourable period of the year, it is advisable to have handlights or sheets of glass ready to place over the plants as a protection against drenching rains or severe frosts.

I. rosenbachiana.—A lovely little bulbous Iris native of the mountains of Eastern Buchara and Turkestan at an elevation of 6000 to 7000 ft. The bulbs have numerous fleshy and often ovoid roots, and tufts of lance-shaped bluntish leaves about 8 in. long and 2 broad. The sessile solitary flowers usually appear in March and April, but sometimes in February, when the leaves are very short, or even before they have appeared. The prevailing colour is a combination of purple, yellow and white, but is very variable, and some forms are of a rich crimson or purple-blue passing into a dull or dingy lavender, while others are nearly pure yellow with a few purple or violet markings. There is also a form with pure white flowers except for a large blotch of deep violet on the blade of the fall.

Culture and Propagation.—This species grows well in a fairly light soil, and is best in warm sunny situations sheltered from violent winds which damage the broad leaves. During the summer and early autumn months the plants should be kept dry so as to thoroughly ripen their bulbs.

I. rubro-marginata.—A pretty stemless Iris about 4 in. high, native of Scutari, having sickle-shaped leaves, 3–4 in. long, and in spring large purple flowers with a purple beard.

Culture &c. as above for 'Bearded Irises,' p. 917. Ordinary soil. Increased by division or seeds.

I. ruthenica.—A beardless species native of E. Europe and Asia, with linear ribbed leaves much overtopping the fragrant flowers which are borne singly in March and April on short slender stems 1–4 in. high. The prevailing colour is lilac-purple, the falls being veined with white. The variety *violacea* has violet-coloured blooms.

Culture &c. as above for 'Beardless Irises,' p. 917. Ordinary soil. Increased by division or seeds.

I. sambucina.—A native of Central Europe, Asia Minor &c., with tufts of glaucous leaves 15–18 in. long, and clusters of large Elder-scented flowers produced in May on branching stems about 2 ft. high; falls claret-purple with a yellow beard; standards dull yellow, suffused with dull claret-purple.

Culture &c. as above for 'Bearded Irises,' p. 917. Ordinary garden soil. Increased by division.

I. Sari.—A fine Oncocyclus Iris from the banks of the river Sar in Cilicia. The typical plant, which has bright lilac flowers, does not appear to be in cultivation, but is represented by the variety *lurida* which has about 6 sword-shaped falcate somewhat glaucous leaves, about 6 in. long and ½ in. broad. The flowers are produced in May, and very much resemble those of *I. susiana*, but are somewhat smaller, and of a soft violet-purple with deeper spots and veins, the falls being darker in colour than the roundish standards and having a diffuse brownish-black beard. When the flowers first open they have the general dark silver-grey appearance of *I. susiana*, but the purple hue becomes more pronounced with age. The variety *nazarene* from Palestine has the falls heavily veined with rows of brownish-purple spots on a pale or straw-yellow ground, and a large maroon blotch in the centre, while the standards are creamy-white beautifully veined with blue.

Culture &c. as above for 'Oncocyclus Irises,' p. 918.

I. serotina.—A native of the calcareous mountains near Jaen in Spain. According to Sir M. Foster it resembles the Spanish Iris (*I. Xiphium*) but appears to differ not only in its very late flowering in August or September, but in being less vigorous, with the upper leaves very thin and awl-like, in having reddish spathe-valves, in the flowers being very much protruded from the spathe-valves, and especially in the fall having an oblong-lanceolate blade and a narrow linear claw.

Culture &c. as above for 'Bulbous Irises,' p. 917.

I. setosa.—A handsome Iris, native of Eastern Siberia to Japan, and somewhat resembling *I. sibirica*. The thin leaves are about 1 ft. long and ½ in. broad, and the clusters of large bright lilac flowers are produced in May and June, on stoutish branched stems 2–3 ft. high.

Culture &c. as for *I. sibirica*. This rather rare species may be increased by division and grown in moist rich soil. The variety *atro-cærulea* has darker blue flowers than the type.

I. sibirica.—A beautiful and fairly common beardless Iris, native of Central and South Europe to Siberia, with tufts of linear ribbed leaves 1–2 ft. long. Flowers in May and June, borne 2–3 together on simple or forked rounded hollow stems, 1–2½ ft. high; they are bright lilac-blue, the falls being veined with deep violet on a paler ground. There are many beautiful garden forms of this species, including double-flowered ones which are not particularly attractive, the white one, *alba*, being one of the most distinct, having white flowers mottled with purple. *Orientalis* differs from the type by the redness of its young leaves, shorter flower-stems, and deeper coloured but less lasting flowers.

Culture and Propagation.—*I. sibirica* and its forms are easily grown in moist soil near the edges of lakes, streams &c., and may be increased by division.

I. sindjarensis.—An interesting bulbous Iris native of Mesopotamia, having very large elongated bulbs and fleshy roots. Leaves 8–10, long and narrowing very gradually to a sharp point, bent into a double channel, much striped on the outside, glossy green on the inside. The flowers 2–4 in. across appear in March and April, and are of a somewhat slaty-blue, broken by the yellow ridge of the fall and by greenish-blue veins and dots. They are distinctly fragrant, with an odour resembling Vanilla.

Culture and Propagation. — This species requires similar treatment to *I. rosenbachiana*.

I. Sisyrinchium (*I. fugax; I. ægyptia; I. samaritana; I. juncifolia &c. &c.*).—This distinct little bulbous Iris about 6 in. high, with shaggy-coated roundish bulbs and arched linear pointed leaves, is the 'Spanish' or 'Barbary Nut' of Parkinson. It is widely distributed on both sides of the Mediterranean shores, chiefly the northern, and is also found from Asia Minor to Afghanistan and the Punjaub. Its flowers appear in May and June, but unfortunately last only a few hours when fully expanded. They are often very fragrant and vary in colour from light blue to reddish-purple with variable spots and veins on the blade of the fall, which bears a broad white patch and a median yellow streak often spotted. Among the various forms is a white one sometimes met with. The variety *monophylla* has one leaf only, and small dull-coloured flowers; and *maricoides* has much-spotted flowers.

Culture &c. as above for 'Bulbous Irises,' p. 917. This plant and its varieties require a warm sunny and sheltered position in light dry soil, and are more suitable for botanical collections.

I. Sofarana.—This is a new species from Lebanon and comes nearest *I. Sari*. It has a large compact rootstock and relatively broad leaves, 10 inches long and about an inch broad. The solitary flowers about 4 in. deep are borne on scapes about 10 in. high. The elliptic falls have a creamy-white ground, but this is almost obscured, and they appear to be blackish-purple owing to thick-set blotched and netted veins of deep purple, with a beard of scattered dark purple hairs on the claw in front of which is a deep black blotch or 'signal.' The roundish standards are much lighter in colour than the falls. The white groundwork is covered with thin purple forking veins and numerous purple spots, while the broad horizontal styles are almost blackish-purple.

Culture &c. as above for 'Oncocyclus Irises,' p. 918. This will doubtless succeed under the same conditions as *I. Sari.*

I. **spuria.** — An elegant beardless Iris 1–2 ft. high, native of Europe, Asia, Algeria &c. with erect or spreading sword-shaped leaves about 1 ft. long. Flowers in June and July, large, in nearly sessile clusters, and of a bright lilac colour, the falls having a bright yellow keel running down the claw which is faintly streaked with purple on a white ground. The variety *Monspur* is really a hybrid between this species and *I. Monnieri*, the first syllable of each parent forming the name. It is a beautiful form. The variety *Notha* is larger than the type, and is said to be found wild in the salt marshes of Siberia. There are other forms, but they all thrive and produce plenty of blossom in ordinary good garden soil.

Culture &c. as above for 'Beardless Irises,' p. 917.

I. **squalens.**—A very old garden plant, native of Europe and Asia, with tufts of glaucous sword-like leaves and clusters of faintly Elder-scented large flowers borne in May and June, on branched stems 2–3 ft. high. The obovate wedge-shaped falls are bright lilac-purple, with a conspicuous yellow beard, while the erect and rather crisped standards are dullish lilac and yellow or brownish-yellow.

There are a large number of garden forms of this species with a vast range of colour among shades of lavender, blue, violet, bronze-yellow, mauve, primrose, golden-yellow, crimson &c. as in the *germanica*, *neglecta*, and *pallida* sections, which they somewhat resemble.

Culture &c. as above for 'Bearded Irises, p. 917. They may all be grown easily and increased in the same way as *I. germanica*.

I. **stenophylla** (*I. Heldreichi*).—A beautiful bulbous Iris, native of the Cilician Taurus. It grows 3–5 in. high and has tufts of grass-like channelled leaves which are only 2–3 in. high when the flowers appear in February and March. The blooms are 3–4 in. across and are of a soft mauvy purple colour, the falls having a large triangular blotch of black velvety purple in front of the raised yellow crest, on each side of which are purplish spots or blotches.

Culture &c. as above for 'Bulbous Irises,' p. 917.

I. **susiana** (*Mourning Iris*). — A remarkably handsome and at the same time singular Oncocyclus Iris, native of the Levant and Asia Minor. It is 12-18 in. high, with pale or yellowish-green, stem-clasping, sword-like leaves about 1 in. broad. The large flowers are borne singly on the stems in April, and having a dark silver-grey appearance, produced by numerous veins and dots of blackish-brown or purple with a flush of purple or lilac on a creamy-white ground; the falls have a broad cushion of brownish-black hairs near the base. ***Muhlendorfiana*** is a dwarf form with yellow flowers.

Culture and Propagation.—It likes warm light soils and requires treatment similar to other Oncocyclus Irises, see p. 918.

I. **Suwarowi** (*I. lineata*).—A curious Iris, native of Turkestan, with narrow sword-shaped leaves, and greenish flowers veined with bluish-green; both falls and standards are elliptic lance-shaped ending in a sharp point, the falls being furnished with a blue beard from the base to centre.

Culture &c. as above for 'Bulbous Irises,' p. 917.

I. **Swerti.** — A handsome Iris of unknown origin with glaucous sword-shaped leaves, and clusters of very fragrant flowers produced in May and June on stems 1–1½ ft. high. Colour pure white slightly veined with lilac, and edged with purple, the obovate cuneate falls being decorated with a yellow beard, while the much-crisped pure white standards are keeled and edged with purple.

Culture and Propagation. — This species flourishes in ordinary good garden soil and may be increased by division.

I. **tectorum** (*I. tomiolopha*).—A rare and beautiful beardless Iris about 1 ft. high, native of Japan, with thin pale green sword-like leaves about 1 ft. long. Flowers in May and June, 1½–2 in. deep, usually bright lilac; the blunt crisped falls are veined with dark lilac, the claw having a deeply laciniated white and lilac crest.

Culture and Propagation.—This Iris grows well in light soils in warm parts of the garden and may be increased by division.

I. **tenax.**—A handsome N. American species 6–12 in. high, with 2 linear leaves and bright lilac-purple flowers 2–3 in. deep borne on slender stems in May and June.

Culture and Propagation. — This species flourishes in ordinary good garden soil and may be increased by division. Should there be any difficulty in growing it, the plants are then better grown in pots plunged in ashes in a cold frame until they become established. In transferring to the open border it is better to break the pot than run the risk of breaking the roots, and thus probably check the plants again.

I. **tingitana.**—A beautiful bulbous Iris native of Tangiers, with large ovoid pointed bulbs and the first sheathing leaf often red, sometimes spotted. Flowers in March and April, 5–6 in. across, 2 on a stem about 2 ft. high, completely hidden by the deeply channelled leaves, which are broad like those of *I. xiphioides*, but very glaucous and striated outside. Falls light or deep blue, or bluish-purple, with deeper veins, and a yellow keel spreading into a broad patch behind. Standards and styles usually deeper in colour than the falls.

Culture and Propagation. — The cultivation of *I. tingitana*, says Sir M. Foster, is peculiarly difficult in this country, at least in most districts. The plants start growth early, and their relatively broad ample foliage is terribly punished by winter storms. Moreover, they need genial moisture and more decided warmth in early spring, just as they are preparing to flower, than they obtain in most parts of the country. The plants are hardy enough in the sense that they can, unprotected, stand without injury even our severest frosts; not winter but cold cutting spring is their enemy; they live but refuse to bloom. The most suitable place for *I. tingitana* is at the base of a south wall. It has far better chances of developing its magnificent flowers in the warm sunny south than in the bleak cold north.

I. **trojana.** — A native of Troy about 3 ft. high, with glaucous-green sword-shaped leaves and sweet-scented flowers borne on branching stems. The broadly wedge-shaped falls are of a bright purplish-violet, the base being white with yellow margins veined with coppery purple. The broadly elliptic standards are violet, and the styles are bluish-violet with broad toothed crests.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. **tuberosa** (*Hermodactylus tuberosus*).—*Snake's Head Iris.* — A distinct and interesting species, native of both sides of the Mediterranean Sea. It is not a bulbous Iris in the strict sense of the word, although usually classed as such, as it has a tuberous branched rootstock like a small hard deformed Potato. The leaves are often very long, 4-sided, with a horny point. The flowers, about 2 in. across, appear in March and April on slender hollow stems about 1 ft. long, and are of a peculiar olive-green colour, with dark almost black velvety purple falls, occasionally streaked with yellow or bright green. There is a good deal of variation in plants from different localities.

Culture and Propagation.—*I. tuberosa* should be grown in the warmest, driest, and sunniest part of the garden, and succeeds best in a moderately light loam. Although perfectly hardy it is often spoiled by the cold winds which prevail at its period of flowering. In suitable positions it flowers freely, and is best left undisturbed for 3 or 4 years or even more when in a flourishing condition. Increased by division.

I. **unguicularis** (*I. stylosa*). — A lovely beardless Algerian Iris with a rhizome as thick as a man's finger, and tufts of distichous linear bright green leaves equalling or over-topping the large fragrant bright lilac or sky-blue flowers which are produced in January and February, the bleakest period of the year. There are several forms of this species, including *alba* with large white flowers and *speciosa* with deep rich blue flowers veined with white. There are also forms known as *angustifolia*, *Elisabethæ*, *grandiflora*, *lilacina*, *marginata*, *pavonia*, and *purpurea*.

Culture and Propagation.—*I. unguicularis* (which is much better known as *I. stylosa*) is hardy enough in most parts of the British Islands, but owing to the delicacy of its beautiful flowers, which appear at the worst period of the year, it is not likely to show to advantage unless the wet can be kept off the blossoms. A position sheltered from driving rains should be chosen for the plants. Grown in pots they make excellent displays in greenhouses and conservatories during the winter; but under a south wall, where they can have the protection of a hand-light or frame, they look very handsome and flower freely. Increased by division.

I. variegata.—A very handsome Austrian Iris of the *germanica* group, with tufts of sword-like leaves 12–18 in. long, purple at the base. Flowers in May and June, several on a glaucous stem 12–18 in. high; falls oblong, narrowed at the base, deep claret-brown with a bright yellow beard and brown veins on a yellow ground; standards erect, oblong, bright lemon-yellow. There are many beautiful garden forms of this species having various shades of yellow, bronze and purple predominating, although *alba* with white flowers is an exception. They may all be grown in masses in the same way as the German Iris.

I. lurida is closely related to *I. variegata*, but has narrower leaves and flowers early in April, and has the upper half of the falls and standards of a dead purple colour.

I. squalens from a botanical point of view also comes very near *lurida*, and it is possible that many of the forms under *I. hybrida* have been derived from the intercrossing of these forms.

Culture &c. as above for 'Bearded Irises,' p. 917.

I. Vartani.—A curious little bulbous Iris from the neighbourhood of Nazareth, with ovoid netted bulbs and 4-sided horny-tipped leaves 4–6 in. long at the time of flowering. Flowers 3-4 in. across, appearing about October. The predominating colour is slaty-blue or dull lavender; the falls having a yellow or white blade with black dots on the claw.

Culture &c. as above for *I. bakeriana* and 'Bulbous Irises' generally. See p 917. This species is of botanical rather than flower-garden value.

I. versicolor.—A beautiful Beardless Iris from N. America with rather glaucous sword-shaped leaves and clusters of large claret-purple flowers borne in May and June on forked roundish stems 1–2 ft. high. The standards are paler in colour than the much larger falls, which are beautifully veined with deep purple. There is much variation in the colour and several forms exist, that known as *kermesina* having lilac standards and reddish-lilac falls net-veined with white. *Iris virginica* is considered to be a form of this, having bright lilac flowers.

Culture &c. as above for 'Beardless Irises,' p. 917.

I. xiphioides (*I. anglica; I. pyrenaica; Xiphion latifolium*).—*English Iris.*—A beautiful Pyrenean Iris having bulbs with brown coats which when old become more or less shaggy. The leaves are stouter and broader than those of the Spanish Iris, and do not appear until spring. Flowers in July, of a rich deep blue in the wild type, with a conspicuous golden keel on the rounded fiddle-shaped fall.

There are now a large number of cultivated forms of the English Iris, varying in colour from blue and through various hues of purple to red and pure white. In catalogues many distinctive names will be found, some of the best forms being *Blanche Fleur*, *La Sincérité*, *Oriental*, and *Mont Blanc* among the whites, the latter being a particularly fine form; *Anna Maria*, *Bleu mourant*, *Clio*, *Conquerant*, *Charles Dickens*, *Ceres*, *l'Obscurité*, and *Nimrod*, among the lilac, blue and purple and violet shades; *Masterpiece* and *Nimrod*, blackish-purple; *Duke of Portland*, *La Triomphante*, and *Penelope*, among the white and rose, or purple-spotted and striped shades. There are many other names all differing according to the particular catalogue.

Culture and Propagation.—English Irises are excellent border flowers, and have the advantage of flowering later than their equally beautiful relative the Spanish Iris. They flourish in ordinary light garden soil of a more or less sandy nature, but like plenty of moisture during the period of growth. They are best not disturbed for 2 or 3 years, during which time they will have greatly increased. When divided about August or early in September the bulbs should be replanted almost immediately, about 6 in. apart and 2-3 in. deep, as they soon start into growth again.

I. **Xiphium** (*I. hispanica; Xiphion vulgare*).—*Spanish Iris.*—A charming bulbous Iris native of S. Europe, with smooth, brownish, ovoid bulbs, and linear, glaucous, awl-shaped leaves 12-18 in. long. Flowers in May and June, 3-4 in. across, variously coloured with shades of purple, bronze, and yellow, and having a large number of garden varieties, including white ones. A distinct natural form from Portugal, known as *lusitanica*, has pure yellow flowers with an orange blotch on the fall, and is doubtless the progenitor of the various yellow garden varieties. The form known as 'Thunderbolt' is a strong free-growing plant 2 ft. or more high, having large flowers of a peculiar bronzy or smoky hue, produced by the fusion of purple and yellow with brown. The variety *Battandieri* from Algiers is like the type, but has very glaucous foliage and dead white flowers with an orange ridge on the fall.

Culture and Propagation.—The Spanish and English Iris will not grow very well under the same treatment. The English likes a fair amount of moisture at the roots in summer, while the Spanish prefers a rather dry situation. Given such a situation and fairly good soil, they will flower profusely year after year without any trouble. When the smaller flowers begin to appear it is a sign that the soil is becoming exhausted, and the bulbs should be lifted and replanted in fresh quarters when the foliage has withered. As cut flowers for room decoration the Spanish Iris is excellent. Long before the flowers in the British Islands open out of doors, tons of 'spears,' or unopened blossoms, are sent to the London markets from the south of France, the Riviera, and the Channel Islands. These are placed in water and stood in the genial temperature of a hothouse, where they open beautifully bright and clear in a few days, and are then fit for sale.

The following are a few of the finest garden forms of the Spanish Iris, and all are worth growing.

Adelina Patti, deep bronze; *Sappho*, splendid bronze; *Agnes*, blue, very fine; *Alexander v. Humboldt*, deep blue; *Formosa*, dark blue; *Leonidas*, dark violet-blue; *Louise*, lilac-blue, very large, extra fine; *Athalia*, pure white; *Blanche Superbe*, pure white, dwarf; *British Queen*, pure white; *La Dame Blanche*, pure white, dwarf; *La Neige*, pure white, large; *Mont Blanc*, pure white, dwarf; *Belle Chinoise*, very fine yellow; *Chrysolora*, very fine bright yellow; *Leander* deep yellow, very large, scented; *Ovidius*, clear pale yellow; *Princess May*, yellow with bluish centre; *William the First*, golden-yellow.

TIGRIDIA (Tiger Flower).—A genus of bulbous plants with few narrow or broader and plaited leaves. Flowers few in a spathe with a tubeless concave perianth, having free segments, the outer ones very broad, clawed, the inner ones much smaller, more or less wavy. The filaments of the 3 stamens are united in a cylindrical tube. Ovary 3-celled.

Culture and Propagation.—Tiger Flowers develop to the best advantage when grown in warm open sunny positions protected by other vegetation from cold cutting winds, but not shaded or crowded in any way. A deep sandy loam enriched with leaf-mould or well-rotted manure is an excellent soil for them. The surface may receive a mulching of cow-manure when the leaves are fairly well developed, and during hot dry summers frequent soakings with water will be beneficial, especially about the period of blooming.

Being natives of a warmer country than our own, the Tiger Flowers are not strictly hardy, although in southern localities they suffer no injury in being left in the ground during the winter, if the crowns are protected with a little ashes or litter. The safest and best plan, however, is to lift the bulbs every year at the end of October or November when the leaves have completely faded. The side bulblets should be detached and preserved and the leaves of the old ones trimmed after bunches have been made for the sake of tidiness in storing. They may be kept in dry airy frost-proof places in the same way as Dahlia roots; or, better still, the bulbs may be placed in layers and covered with dry sand until the time for replanting comes round again, usually from the end of March to the beginning of May.

Tigridias are easily increased by the separation of the small bulbs from the larger ones when lifted. The smaller ones should be grown by themselves the first season until they have become good flowering bulbs. Seeds may also be sown in spring on hotbeds, the seedlings being pricked out and grown on in gentle heat until June. They may then be planted out in a specially prepared patch or grown on in pots until the following season. Many of them will flower the second year, and nearly all the third.

Besides the above there are several other species of *Tigridia*, but not hardy enough for the outdoor garden. The plants described have flowers of exceptional beauty and brilliance, and it is rather astonishing that they are not more generally grown. True, the individual flowers are not of long duration: they open in the morn and close in the afternoon for ever, but each day they are replaced by fresh ones; when grown in suitable situations, the flowering period may extend from July into August and even September.

T. Pavonia (*Ferraria Pavonia; F. Tigridia*).—*Peacock Tiger Flower.*—A handsome showy Mexican plant with forked leafy stems 1–2 ft. high, and lance-shaped, pointed, plaited leaves 12–18 in. long, sheathing at the base. Flowers in summer, about 6 in. across, the outer segments of the perianth being broadly ovate, about 3 in. long, violet at the base, with zones of yellow blotched with purple and of a brilliant scarlet at the tip; the cupped inner segments are much smaller, and yellow blotched with purple. There are now many charming varieties of the Peacock Tiger Flower grown, the best being *grandiflora*, with larger and more brilliant flowers than the type, and its forms *alba*, with a pearl-white ground, *conchiflora* recognised by its yellow flowers blotched and 'tigered' with purple; *alba* is a superb form with pure white and purple-spotted flowers; *speciosa* is somewhat like *grandiflora*; and *Wheeleri* has very large flowers of a brilliant red.

Culture &c. as above.

T. Pringlei.—A native of S. Mexico having small bulbs with spindle-shaped roots and slender stems 1–2 ft. high, with 2–3 winged plaited leaves. The shallow cup-like flowers are borne singly on the stems in July and August, and are of a brilliant scarlet blotched with crimson.

Culture &c. as above.

FERRARIA.—A genus of interesting dwarf plants with tunicated bulbs or corms, sword-like leaves and several flowers in a spathe. The perianth is cup-shaped with 6 spreading lance-shaped or oblong segments often contracted at the base, and with wavy crisped edges. The 3 filaments are united in a tube, and the 3 stigmas surmounting the linear ovary are petal-like and fringed.

F. undulata.—A distinct S. African plant with branching flower-stems and equitant sword-like wavy leaves, the outer ones being about twice as broad as the inner ones. The peculiar greenish-brown or dull plum-coloured flowers with wavy segments, spotted with purple are produced in March and April.

Culture and Propagation.—The above is the only species grown out of doors in warm sunny positions in light well-drained soil. The bulbs should be lifted in autumn like the Tigridias, and the plants may be increased like them by means of bulblets or offsets, and also by seeds if any are ripened.

CROCUS.—A genus of well-known popular plants with fleshy corms having sheathing fibrous coats and narrow slender linear channelled radical leaves recurved at the margins, and appearing at the same time as the flowers or after them. Flowers solitary with a regular funnel-shaped perianth, composed of 6 equal segments. Stamens with short free filaments. Ovary oblong, 3-celled; stigmas more or less cleft or fringed.

About 70 species of Crocuses have been described, and most of them are in cultivation. Many, however, are only to be met with in botanic gardens, and are either too delicate or too rare to be generally cultivated out of doors in the colder parts of the kingdom.

Crocuses are peculiar inasmuch as they do not all flower at the same period of the year. Some produce their blossoms in the autumn from the end of August to November, while others do not blossom until about February and continue to the end of March or beginning of April. For this reason gardeners have roughly classified Crocuses into two groups according to their period of flowering, as follows:—

1. **Spring-flowering Crocuses.**—Appearing at the dullest and bleakest time of the year Spring Crocuses are not un-

naturally great favourites in the flower garden. They may be used in a variety of ways with other early-flowering bulbs like Snowdrops (*Galanthus*), Spring Snowflakes (*Leucojum vernum*), the Spring Meadow Saffron (*Bulbocodium vernum*), and also dwarf early-flowering plants like the Winter Aconite (*Eranthis hyemalis*), either in beds, borders, groups &c. The individual flowers do not last very long, but they are produced in such profusion that the flowering period extends over several weeks.

Culture and Propagation.—They are easily grown in light well-drained sandy loam, which may be enriched with a little leaf mould or well-decomposed cow-manure, although this is not essential in ordinary good garden soil. The corms should be planted in September and October to secure the best results, but planting is often deferred until as late as December, with little injury to the corms, if kept in a dry airy place in the meantime. The beds or borders may receive a thin coating of coco-nut fibre, which not only serves as a protection to the bulbs, but also makes an excellent background for the bright colours of the flowers.

There is little difficulty in increasing Crocuses. The production and separation of the young corms are so easy that it is scarcely worth while to raise plants from seeds. The best time for lifting the corms is when the leaves have completely withered. They are then quite ripe, and after the young offsets have been detached may be cleaned by separating them from the dead roots, leaves, and shrivelled corms of the previous season. It is sometimes advised not to disturb the corms for two or three years, but this is not good practice, especially where other plants are grown on top, and many corms are destroyed in working the soil.

Corms planted in September and October yield better and more numerous offsets than those planted later. When seeds are used they should be sown as soon as ripe or very soon after gathering in pots, pans, or cold frames or even in the open border in nice light prepared soil, in the latter case protecting them with litter during the winter. The seeds will not sprout until spring, and will take 2–3 years to produce flowering corms. For the first two years they are best left in the bed where sown. Afterwards they may be treated like the old corms.

The following is a list of the best spring-flowering Crocuses described below:—

Alatavicus.
Aureus.
Balansæ.
Banaticus.
Biflorus.
Biliotti.
Carpetanus.
Chrysanthus.
Corsicus.
Dalmaticus.
Etruscus.
Fleischeri.
Imperati.
Korolkowi.
Malyi.
Minimus.
Nevadensis.
Nudiflorus.
Olivieri.
Reticulatus.
Sieberi.
Stellaris.
Suaveolens.
Susianus.
Tommasinianus.
Vernus.
Versicolor.
Vitellinus.

2. **Autumn-flowering Crocuses.** — These are quite as hardy and ornamental as the spring-flowering Crocuses, but the later kinds are likely to become a good deal damaged by wind and rain unless protected in pits or frames. The earlier kinds may be used for the decoration of beds, borders, lawns, grass land &c., either by themselves or in conjunction with the Meadow Saffrons (*Colchicum*) and Lily of the Field (*Sternbergia*), which flower at the same period. They like light, rich, well-drained soil and open airy situations, and may be increased in the same way as the spring-flowering Crocuses by separation of the offsets and by seeds when ripe. The corms may also be left in the soil for two or three years without disturbance. The best time for planting autumn Crocuses is about the end of July or beginning of August, and the corms should not be taken up until the foliage has quite withered, say about May.

The following is a list of autumn Crocuses described below:—

Asturicus.
Cancellatus.
Clusi.
Hadriaticus.
Iridiflorus.
Karduchorum.
Longiflorus.
Medius.
Ochroleucus.
Pulchellus.
Salzmanni.
Sativus.
Scharojani.
Speciosus.
Zonatus.

C. alatavicus.—A native of the Siberian mountains in Asia with grassy leaves about 1 ft. long when fully developed. Flowers in February, small, white, with a smooth yellow throat, the 3 outer segments being obscured, freckled and feathered with purple outside. There is a variety white within, pale buff outside.

The variety *porphyreus* has outer segments of a bright claret-purple, the inner ones being white.

Culture &c. as above, p. 937.

C. asturicus.—A pretty Spanish autumnal Crocus with leaves about 1 ft. long, produced after the flowers. The latter appear from September to November, and are 4–5 in. long, with a violet bearded throat. The segments are violet or purple, with a few darker lines near the base, and are variable in colour although rarely white. There are several pretty forms, the best being *azureus*, blue; *atropurpureus*, dark purple; *lilacinus*, lilac; *pallidus*, pale mauve; and *purpureus*, bright purple.

Culture &c. as above, p. 937.

C. aureus (*C. lagenæflorus; C. mœsiacus &c.*).—A beautiful old Crocus, native of S.E. Europe, with linear leaves and rich golden-yellow flowers usually produced in February. From this species the common or 'Dutch Yellow' Crocus of gardens has descended, and also numerous varieties like *Aucheri*, deep orange; *lacteus* and *lacticolor*, milky-white; *sulphureus* and *sulphureus pallidus*, sulphur- or fine primrose-yellow; *luteus striatus* with 8 distinct black stripes on the back of the outer segments, &c.

Culture &c. as above, p. 937.

C. Balansæ.—A pretty little Crocus, native of Western Asia Minor, and remarkable for its pear-shaped corms about 1 in. broad and leaves about 10 in. long. Flowers in March, 2–2½ in. long, orange-yellow, the outer surface feathered or tinted with brown or bronze.

Culture &c. as above, p. 937.

C. banaticus (*C. veluchensis*).—A native of South Hungary, with leaves about 15 in. long, having wide and open side channels. The beautiful flowers appear in February and March and are about 3 in. long, with a white throat; the inner segments are rich bright purple, with deeper coloured markings near the apex, and are paler than the outer ones, varying to white or variegated with purple and white. There are several good forms of this species, such as *albiflorus*, *concolor*, *niveus*, *pictus* and *versicolor*.

Culture &c. as above, p. 937.

C. biflorus (*Scotch* or *Cloth of Silver Crocus*).—A handsome Crocus found wild in many parts of Italy and extending eastwards to the Caucasus. It has short erect narrow leaves having a distinct white midrib. The flowers appear in February and March and vary in colour from white to a pale lavender, the outer surface of the outer segments being distinctly feathered with purple and yellow within.

There are many forms of *C. biflorus*. *Argenteus* is snowy white feathered with black and has conspicuous bright orange stigmas; *estriatus* rosy-lilac washed with buff; *Adami* from the Caucasus is pale purple or feathered outside with deeper veins; *minor* is a free-flowering form with lilac inner segments, the outer ones being striped with purple; *Pestalozzæ* is a charming variety with small white and yellow flowers, and is a form of *nubigenus* from Asia Minor, the flowers of which are suffused and speckled with brown; *perpusillus* is excellent for edgings and masses, and has an orange throat and white feathered outer segments; and the Hungarian *Weldeni* varies from pure white to mauve stained with blue. The variety *Leichtlini* is of more recent origin and is recognised by its white or pale purple sweet-scented flowers with narrow lance-shaped segments.

Culture &c. as above, p. 937.

C. Biliotti. — A charming Crocus, native of Trebizond, having dark rich purple flowers in spring, with a deeper coloured blotch near the throat. The anthers are yellow, and the stigmata orange.

Culture &c. as above, p. 937.

C. cancellatus. — A handsome autumnal Crocus native of Asia Minor with leaves about a foot long appearing in spring after the blossoms have withered. The flowers appear from September to December and are 4–5 in. long with a yellow unbearded throat. The segments vary from white to pale purple and are sometimes feathered with purple. The variety *cilicicus* has lilac flowers veined with purple, a form of it called *lilacinus* has larger soft lilac striped blossoms; the variety *mazziaricus* is white with a bright golden-orange throat.

This and other late-flowering autumnal Crocuses are charming in the flower border, rockery or grass, but their beautiful blooms are frequently spoiled by cold drenching rains at the end of the year. Grown in pots or cold frames where they can be protected from wet they look very handsome.

Culture &c. as above, p. 937.

C. carpetanus.—A distinct species from Spain and Portugal characterised by slender cylindrical unkeeled and unchannelled leaves about 8 in. long. Flowers from February to April, about 8 in. long, with a white unbearded throat, and segments varying from delicate vinous-lilac to white, darker on the margins, the outer surface suffused with bluish veins towards the base.

Culture &c. as above, p. 937.

C. chrysanthus.—A native of S.E. Europe with rich orange-yellow flowers which are produced from January to March, and require to be protected from heavy rains. There are several forms, including *albidus*, white with a blue base; *Canary Bird*, rich canary-yellow, sweetly scented; *fusco-lineatus*, clear yellow, striped with crimson-brown; *cæruleescens*, bluish-tinted; and *fusco-tinctus*, clear yellow suffused with brown.

Culture &c. as above, p. 937.

C. Clusi.—An autumnal Crocus, native of Spain and Portugal, with leaves 9–10 in. long having 8 prominent ridges on the margins. Flowers from September to December, 8–4 in. long, with a white bearded throat, and pale purple unfeathered segments deeper in colour near the base.

Culture &c. as above, p. 937.

C. corsicus (*C. insularis*).—A rather rare Corsican species with leaves about 8 in. long, having wide and open lateral channels. Flowers in April 2–8 in. long, with a white or lilac unbearded throat, and pale purple segments, feathered and striped with purple outside, and tinged with buff. Stigmata bright scarlet.

Culture &c. as above, p. 937.

C. dalmaticus.—A Dalmatian Crocus with pear-shaped corms and leaves 8–9 in. long, having a convex keel. Flowers in February and March, about 2 in. long, with a yellow unbearded throat, and pretty lilac segments, the outer ones shaded fawn, with a few purple veins at the base or delicately feathered with purple. There is a pretty form called *violaceus*, having violet and blue flowers.

Culture &c. as above, p. 937.

C. etruscus.—An Italian Crocus with narrow linear leaves having a central white band and revolute edges. Flowers in March, 2–8 in. long, the tube striped with lilac and the throat yellow. Segments bright lilac-purple inside, the 8 outer ones with five lilac or purple stripes down the back.

Culture &c. as above, p. 937.

C. Fleischeri.—A handsome Crocus, native of Western Asia Minor, with a beautifully netted yellow corm and leaves about 1 ft. long. Flowers in early spring, about 8 in. long, with a pale yellow unbearded throat, and white linear lance-shaped segments, the outer ones being veined with rich purple.

Culture &c. as above, p. 937.

C. hadriaticus.—A distinct autumnal Crocus from the Grecian Archipelago, with leaves over 1 ft. long, ciliated on the margins and keel. Flowers about October, 8–4 in. long, with a white or purple bearded throat, and ovate lance-shaped segments pure white or purple towards the base. The pretty variety *chrysobelonicus* has white flowers with a yellow throat feathered at the base with reddish lines.

Culture &c. as above, p. 937.

C. Imperati.—A very fine Italian Crocus with thick linear recurved leaves having a distinct white line down the centre. Flowers from January to March, sweet-scented, lilac-purple inside, the outer segments being marked with three deep purple lines more or less feathered. The variety *albidus* has white faintly striped flowers; *roseus* has flowers of a clear rose; and *purpureus* white outside, purple inside.

Culture &c. as above, p. 937.

C. iridiflorus (*C. byzantinus*).—A fine autumnal Crocus from the Banat and Transylvania producing in September and October its distinct flowers. The 8 larger ovate outer segments are a clear rich purple, in contrast to the 8 much smaller pale lilac inner segments. The stamens have lilac filaments and orange anthers, while the stigmas are purple, a combination that makes the flowers attractive.

Culture &c. as above, p. 937.

C. Karduchorum.—An Armenian Crocus with slender grassy leaves 1–2 in. long, those of the previous year persisting until the flowering period next autumn. The flowers have a long unbearded perianth tube and vinous-lilac segments, each of which is veined with delicate purple lines about halfway up. The anthers and stigmata are creamy-white. This species somewhat resembles *C. zonatus*, but the flowers are smaller, and there are two small orange spots at the base instead of the bright golden zone.

Culture &c. as above, p. 937.

C. Korolkowi.—A pretty species from Central Asia with clusters of narrow linear leaves having revolute edges and a distinct white line down the centre. Flowers in February and March, with a brownish perianth tube about 2 in. long, and bright yellow segments, the outer ones being tinged with brown.

Culture &c. as above, p. 937.

C. longiflorus.—A beautiful free-flowering autumnal Crocus, native of S. Italy, Sicily &c., having leaves 8–9 in. long, appearing at the same time as the sweet-scented flowers. The latter are produced in October and November, and have a yellow perianth tube about 4 in. long, and a slightly bearded orange throat. The segments are of a uniform pale vinous-lilac, yellow towards the base, or feathered with purple. The variety *medius* has white flowers.

Culture &c. as above, p. 937.

C. Malyi.—A very rare and pretty species from Monte Vermaz with leaves over 1 ft. long appearing with the flowers in March. Perianth tube yellow, about 3 in. long, with a bearded orange throat. Segments white, orange near the throat, occasionally suffused with vinous-purple outside.

Culture &c. as above, p. 937.

C. medius.—A handsome autumnal Crocus from the Riviera with leaves about 1 ft. long, the edges of the keel and blade slightly ciliated, the lateral channel broad and open, and containing 3 low ridges. Flowers in October and November, 4–5 in. long, with an unbearded whitish throat veined with purple. Segments bright purple, veined inside towards the base with deep purple, and in strong contrast to the bright scarlet branched stigma. The variety *pallidus* has pale rosy-lilac flowers.

Culture &c. as above, p. 937.

C. minimus.—A pretty little Corsican Crocus with small pear-shaped corms, and deep rich purple flowers produced in March and April, after the leaves have appeared. The perianth tube is about 2 in. long, with a white or lilac beardless throat. The flowers are usually suffused with buff and veined with purple outside, but are occasionally white or self-purple.

Culture &c. as above, p. 937.

C. nevadensis (*C. atlanticus; C. algeriensis*).—A native of Spain and Algeria, flowering in January, with a perianth tube 2–3 in. long, and a bearded pale yellow throat, and pale lilac or white segments, variously feathered and veined with purple outside.

Culture &c. as above, p. 937.

C. nudiflorus (*C. fimbriatus; C. multifidus; C. pyrenæus*).—A handsome autumn Crocus native of S.W. Europe, but now naturalised in meadows in the midland and northern counties of England. Flowers in September and October, pale bright purple or violet, with a beardless throat, and a perianth tube 8–10 in. long. There is a white-flowered form called *albus*. The brown netted corms have creeping shoots which form independent corms when the parent one dies.

Culture &c. as above, p. 937.

C. ochroleucus.—A beautiful autumnal Crocus from Asia Minor with leaves about 1 ft. long appearing before the flowers. The latter are produced from October to December, and have a pale buff tube over 3 in. long, and a slightly bearded orange throat. The segments are creamy-white tinged with orange towards the base, and if protected from the rain look very handsome.

Culture &c. as above, p. 937.

C. Olivieri.—A pretty species from Greece with leaves appearing at the same time as the bright orange flowers about March.

Culture &c. as above, p. 937.

C. pulchellus.—A handsome Turkish autumn Crocus with narrow, prominently keeled leaves, and large beautiful lavender-blue flowers, with deeper veins and an orange-yellow throat, produced freely from September to December.

Culture &c. as above, p. 937.

C. reticulatus (*C. variegatus*).—A pretty Crocus, native of Central and S.E. Europe with netted corms and channelled leaves. The flowers appear early in March, and vary from white to deep lilac, the outer segments being feathered with purple. The anthers are orange, and the stigmas are scarlet. The variety *micranthus* simply differs in having smaller flowers, but it is a native of Cilicia.

Culture &c. as above, p. 937.

C. **Salzmanni.**—An autumnal Crocus from the S. of Spain and N. Africa, with prominently keeled leaves, 12–18 in. long, developed before the flowers in autumn. The perianth tube is 3–4 in. long, with a bearded yellow throat, and vinous - lilac or sometimes white segments, feathered with purple outside.

Culture &c. as above, p. 937.

C. **sativus** (*Saffron Crocus*). —This species and its many forms are found from Italy eastwards to Kurdistan, and may be distinguished by the rather large globular depressed corms and narrow keeled and ciliated leaves. The flowers appear from October to early in December, and have a white or purple bearded throat and bright lilac segments, purple towards the throat and suffused throughout with purple veins. The scarlet drooping stigmata are occasionally fringed and about 2 in. long. The cultivated forms furnish the Saffron of commerce, but they never produce seed. Of the many forms, those most often seen are *cartwrightianus*, lilac, and its white form *albus*; *Elwesi*, rosy-lilac; *Haussknechti*, very free-flowering; *Pallasi*, lilac, delicately veined; *Taitia*, deep lilac.

Culture &c. as above, p. 937.

C. **Scharojani.**—A distinct and handsome Crocus, native of the Western Caucasus, where it grows wild at an elevation of about 7000 ft. The flowers appear in July and August and are of a bright deep orange-yellow with acute perianth segments and a 3-cleft stigma. The leaves appear after the flowers, and persist until the flowering period the following year.

Culture &c. as above, p. 937. This Crocus is injured by lifting and storing, as it is nearly always in growth. If lifted immediately after flowering, the corms should be replanted at once.

C. **Sieberi** (*C. nivalis; C. sublimis*). This species is abundant at high elevations on the Greek mountains and archipelago, and its smooth leaves, with open unribbed lateral channels, appear with the flowers in February and March. The perianth is of a uniform bright lilac with a rich golden base, and a beardless orange throat, in the centre of which are the orange stamens and orange-scarlet stigmata. The variety *versicolor* varies in colour from white to purple, with white and purple veins and feathering, and always a rich golden-yellow base.

Culture &c. as above, p. 937.

C. **speciosus.**—This handsome species extends from Central Europe eastwards through the Crimea and Caucasus to Persia, and is perhaps the finest of all the autumnal Crocuses. It has roundish corms, and prominently keeled leaves appearing almost at the same time as the large flowers, which show at the end of September and in October. They are of a beautiful bright lilac or bluish-purple, striped inside with deeper purple, and having bright orange conspicuously fringed stigmata in the centre. The variety *transylvanicus* has flowers of a deeper purple-lilac than the type, and with it is excellent for naturalising in grass land.

Culture &c. as above, p. 937.

C. **stellaris**, the origin of which is obscure, has long been in cultivation, and has been considered a hybrid between *aureus* and *susianus*, as it combines the characters of both these species. It has orange flowers distinctly feathered with bronze outside, and these appear in early March, but have never been known to mature seeds.

Culture &c. as above, p. 937.

C. **suaveolens.**—A fine Italian species with leaves 8–9 in. long appearing with the flowers in March. Perianth tube 3–4 in. long with a bright orange beardless throat, and narrow lance-shaped lilac segments, the outer surface being suffused with buff and lined with purple.

Culture &c. as above, p. 937.

C. **susianus** (*C. revolutus*).—*Cloth of Gold Crocus.*—A charming Crocus from the Crimea and Caucasus with ciliated leaves, producing its deep orange flowers in February, variously feathered with deep brown, occasionally entirely orange-yellow, or evenly suffused with brown. The orange anthers are twice as long as the orange filaments, and contrast with the orange-scarlet stigmata.

Culture &c. as above, p. 937.

C. **tommasinianus.** — A Dalmatian Crocus with channelled leaves 9–10 in.

long appearing with the flowers in March. Perianth 3 in. or more long with a white beardless throat and pale sapphire-lavender segments, occasionally with a dark blotch at the apex. Excellent for naturalising in grass. The variety *atropurpureus* has rich clear lilac blossoms; and *pallidus* soft lilac.

Culture &c. as above, p. 937.

C. vernus (*Spring Crocus*).—A beautiful and well-known Crocus from the Pyrenees, Alps and Carpathian Mountains with linear channelled ribless leaves appearing at the same time as the flowers early in February and March in cultivation, or as late as June and July on the mountain tops of Europe. They have a bearded throat, and are lilac, violet, and white in colour, but never yellow, and variously striped with other colours.

Culture &c. as above.

From this species nearly all the garden forms imported in such quantities from Holland have been derived. They exhibit a vast range of colour from pure white, through grey, lilac, violet and purple, many of them being finely striped and variegated. The following is a list of the best garden forms of the Spring Crocus:—

White varieties sometimes lined with purple

Caroline Chisholm, Le grand Conquérant, Mont Blanc, Queen Victoria, Reine Blanche, Variegatus, Alfred Tennyson, George Maw, Lady Stanhope, Leucorhynchus (Pheasant's Feather), Madame Marmont, Madame Mina, Obovatus.

Blue, lilac, purple, and yellow varieties

Albion, Baron von Brunow, Concinnus, David Rizzio, Emperor, Ira Aldridge, King of the Purples, La Majestueuse, Leedsi, Leucostigma, Lilaceus superbus, Lord Derby, Lord Palmerston, L'Unique, Margot, Miss Patti, Ne plus ultra, Othello, President Grant, Pride of Albion, Prince Albert, Purpurea grandiflora, Sir John Franklin, Sir Walter Scott, Yellow Mammoth.

C. versicolor (*C. fragrans*).—A beautiful Crocus from the Maritime Alps with pear-shaped corms and channelled and ribbed leaves 8–9 in. long when mature. Flowers in March, varying from purple to white, self-coloured, or feathered and veined with purple outside, the inner and outer series of segments being similarly coloured. This is one of the oldest Crocuses in cultivation, and many fine forms have arisen from it.

Culture &c. as above, p. 937.

C. vitellinus. — A Syrian Crocus with tufts of 5-6 leaves appearing at the same time as the bright orange flowers. The coppery brown styles are cut into numerous slender branches.

Culture &c. as above, p. 937.

C. zonatus.—An ornamental and free-flowering autumnal Crocus from the Cilician mountains and Lebanon. The channelled leaves about 1 ft. long have a white band down the centre. The flowers appear in September and October, having a pale buff perianth tube about 3 in. long, bearded bright yellow throat, and rosy-lilac segments, veined or lined with purple inside, and having bright orange semi-circular spots or zones at the base.

Culture &c. as above, p. 937.

LIBERTIA.—A genus with 8 species of pretty perennials having creeping rootstocks and tufts of equitant linear or narrowly sword-shaped, often stiffish leaves more or less prominently veined. Flowers in loose cymes or panicles, having a bell-shaped perianth with 6 free divisions, the 3 inner ones of which are larger than the others. Stamens 3. Ovary 3-celled, becoming a roundish 3-furrowed capsule when ripe.

Culture and Propagation.—Libertias are rather slow-growing plants, but they thrive better in rich sandy peat than in loam, and may be planted in bold masses in the warmest nooks of the rock garden or in the flower border, or on the margins of peat-loving shrubs like Rhododendrons, Kalmias &c. They are fairly hardy in the milder parts of the kingdom, but it is wise to give them a little protection in winter from severe frosts by means of litter, bracken &c., or handlights. They are best increased in spring as growth is commencing afresh by very carefully dividing the tufts with a sharp knife. Seeds may also be sown when ripe in cold frames or greenhouses, but it is a long time before they produce flowering plants.

L. formosa. — A beautiful Chilian perennial 1–2 ft. high, with deep green sword-shaped leaves which retain their colour well during the winter months

Flowers in May, pure white, opening successively from the bottom of the truss upwards.

Culture &c. as above. This is the best of the Libertias, but the following may also be associated with it as they resemble it in appearance: *L. grandiflora*, from New Zealand, about 3 ft. high, with white flowers, and *L. ixioides*, also from New Zealand, 2-4 ft. high, with white flowers and pale yellow stamens.

SISYRINCHIUM (BLUE-EYED GRASS; RUSH LILY; SATIN FLOWER).—A genus of perennial plants with short rootstocks and fibrous roots, and stems equally or slightly thickened at the base. Leaves radical or clustered linear roundish or more or less sword-like, always narrow. Flowers several in a spathe, the perianth having nearly equal obovate or oblong lobes. Filaments united in a tube, or rarely free at the base.

There are about 50 species in this genus, all natives of tropical and subtropical America. *S. angustifolium* has become naturalised in the bogs of Western Ireland and produces its small pale blue flowers in July and August.

S. grandiflorum (*Spring Bell*).—A beautiful perennial with a somewhat creeping rootstock, and erect broadly linear striated leaves 6-8 in. long, sheathing at the base. Flowers in May and June, 2 in a spathe on stems about as high as the leaves. Perianth dark purple, striated or white in the variety *album*, the segments being obcordate.

Culture and Propagation.—The species described above is the only one worth growing in the outdoor flower garden. It is a pretty plant for the rockery or garden, and should be grown in masses to produce a good effect. It flourishes in light peaty soil or sandy loam, and may be increased by dividing the rootstocks in early spring.

Bobartia or *Homeria aurantiaca* is a pretty bulbous plant closely related to the Sisyrinchiums. It is a native of S. Africa and produces numerous rich orange-red or yellow blossoms in summer, but is rather too tender for general outdoor cultivation. In the mildest parts it may grow well with protection in winter. It is increased by division in autumn.

SCHIZOSTYLIS (CRIMSON FLAG; KAFFIR LILY).—A small genus of South African perennials with clustered stems on a rootstock or slightly thickened at the base and linear or narrowly sword-shaped leaves. Flowers sessile in the spathes, with a slender perianth tube and equal oblong or ovate spreading lobes. Filaments free.

S. coccinea.—A handsome Gladiolus-like plant 2-3 ft. high, native of Caffraria, having long sheathing sword-like leaves, those from the base being longest, the upper ones forming bracts. The flowers appear late in September, October and November, about 10-14 on a 2-ranked spike, each one about 2 in. across and of a bright crimson-scarlet colour with conspicuous yellow anthers.

Culture and Propagation.—Owing to its free-flowering properties this species is excellent for cut bloom late in the year. It prefers light rich moist soil composed of loam, peat and leaf mould, and during hot summers should be well drenched with water frequently. Warm sheltered places against a south wall or fence suit it best, but the flowers should be protected from frost by lights. Grown in pots this plant makes a useful ornament for the greenhouse late in the year. It is increased by dividing the rootstocks and replanting them in spring about 9 in. apart. Seeds may also be sown in spring in cold frames in the soil mentioned, and the seedlings pricked out and grown on in the frames for the first year, after which they may be planted out.

DIERAMA.—A genus with 2 or 3 species of plants with fibrous-coated bulbs, long narrow sword-shaped leaves, and flowers in terminal panicles. Perianth funnel-shaped with 6 nearly equal erect or spreading lobes. Stamens attached at the base of the tube. Ovary 3-celled, becoming a membranous many-seeded capsule when ripe,

D. pulcherrima (*Sparaxis pulcherrima*).—A beautiful South African perennial 3-6 ft. high, with sword-shaped leaves, and tough slender flower stems which bear numerous funnel-shaped flowers gracefully drooping from thread-like stalks. The blossoms are usually blood-red in colour, but there are forms with white and pale red tints, some being prettily striped. The flowering period is usually about September and October, so that the blooms are sometimes injured by frost.

Culture and Propagation.—This

plant is much better known in gardens under the name of Sparaxis, but as it differs in many respects from those plants it is now separated from that genus. It flourishes in dryish sandy loam in warm sheltered positions, and can be considered hardy only in the most favourable parts of the kingdom. When grown in bold masses in the border or in a thin shrubbery, it is not only beautiful but very graceful as it sways gently in the breeze. The general culture and treatment are the same as recommended below for the Ixias. The plants may be increased by offsets from the old bulbs when the leaves have withered. *D. pendula*, which produces lilac blossoms with deeper veins in June and July, may be treated in the same way.

IXIA.—A genus of beautiful S. African perennials with smooth or fibrous tunicated bulbs or corms and erect strongly veined sword-shaped leaves. Flowers in simple or branched spikes, with a funnel or salver-shaped perianth having a short slender or longish tube, and almost equal, more or less spreading, often nearly rotate lobes. Filaments short, free or united at the base.

Culture and Propagation.—Most of the Ixias have a peculiar elegance of growth and flower, but unfortunately are somewhat too tender for outdoor cultivation in most parts of the British Islands. In the south of England and Ireland they succeed very well, and in less favoured parts with a little attention and protection. They produce masses of attractive flowers which are very useful for cutting, and will retain their freshness for a considerable time in water. The buds in this state will also expand very well.

For outdoor cultivation the corms may be planted between November and January about 3 in. deep, on raised beds of light loamy well-drained soil. At planting time a handful of coarse sand may be placed over and around each bulb. The position chosen should be a warm sunny one protected as far as possible from the cold east and northerly winds. A covering of straw or litter, fern &c. during the winter is advisable as a protection against frost, but it should be removed as early as possible about March, when the leaves are developing. Stiff heavy wet soils are fatal to Ixias, hence the necessity of light free and well-drained soils.

There are several varieties now in cultivation, and they are all very similar in habit and foliage, reaching a height of 1–2 ft. Among the best natural species (many of which were formerly called *Morphixia*) may be mentioned *capillaris*, flesh colour or lilac; *hybrida*, white; *maculata*, orange, spotted at the base; *odorata*, yellow, sweet-scented; *patens*, pink; *speciosa* or *crateroides*, deep red; and *viridiflora*, a remarkable species with masses of beautiful soft sea-green flowers with a brilliant shining black blotch at the base or rather in the centre.

From these have been derived some beautiful garden forms to which various fancy names have been given by the growers.

LAPEYROUSIA. — A genus with about 20 species of perennials with fibrous-coated corms or bulbs, from which spring a few sword-like plaited leaves. Flowers with a funnel- or nearly salver-shaped perianth having spreading and almost equal lobes. Stamens attached to the throat. Ovary 3-celled, becoming a roundish or ovoid capsule when ripe.

L. cruenta (*Anomatheca cruenta*).—An attractive South African species 6–12 in. high, with rather large roundish corms or bulbs, and sword-shaped linear leaves. The flowers, which are of a beautiful deep crimson with a deeper coloured blotch on the base of each of the 3 larger and lower segments, appear in summer and autumn in loose clusters at the ends of the slender stems, and are very effective when the plants are grown in bold masses.

Culture and Propagation.—This plant may be grown in the same way as the Ixias referred to above, but it has a somewhat hardier constitution. It likes warm sunny positions and sandy loam and leaf soil. The corms should be planted about 6 in. deep as a protection against frost, and they should be protected from cold and heavy winter rains, which are injurious. Propagation is most easily effected by separating the offsets after the flowers and leaves have withered; seeds may also be sown in pots in cold frames when ripe, and the following year four or five young bulbs may be grown on in each pot until they make a good clump for planting in the open border.

WATSONIA (Bugle Lily). — A genus of beautiful S. African plants with fibrous-coated bulbs or corms, and often tall stems, with long stiffish ribbed sword-like leaves, and long simple or slightly branched spikes of flowers. Perianth tube slender at the base, curved or recurved, spreading above into nearly equal ovate oblong or lance-shaped lobes. Filaments free, rather long.

Culture and Propagation.—From the Thames Valley southwards, and in mild western districts, the Bugle Lilies may be regarded as hardy out of doors. They like a rich sandy loam with a little peat or leaf mould, and require perfect drainage and warm sunny positions with a more or less southern aspect. They flower well and look very handsome. Increase is generally effected by separation of the offsets from the corms, or by seeds sown in cold frames in spring, and grown on for a couple of years. The corms may be lifted when the foliage has withered, or they may be left in the soil for two or three years without disturbance. When at rest the soil should be kept dry and protected from heavy rains in winter.

W. Meriana (*Antholyza Meriana*). A beautiful species 1–2 ft. high with thick lance-shaped sword-like much striated leaves and spikes of somewhat salver-shaped flowers, purple or scarlet in colour, produced in May and June. There are several fine forms of this, including *coccinea*, a splendid variety with scarlet flowers; *iridifolia*, white, on spikes about 3 ft. high; and *roseo-alba*, pink and white.

Culture &c. as above.

W. rosea (*Gladiolus pyramidatus*). This beautiful plant resembles a Gladiolus in growth. In July and August it produces its crowded pyramidal spikes of beautiful rosy somewhat bell-shaped flowers each about 2 in. long, issuing from purple spathes.

The above are the best known species, but others might be grown with them, such as *angusta* and *brevifolia*, both with scarlet flowers; *densiflora*, rosy-red; and *humilis*, soft rose. A few years ago a charming and large-flowered white variety of *angusta* appeared under the name of *Ardernei*. It is a glorious plant with masses of clear snowy-white flowers, but, except in the mildest parts of the country perhaps, is too tender for outdoor cultivation.

Culture &c. as above.

BABIANA (Baboon Root).—A genus of beautiful plants with fibrous-coated bulbs or corms and stiffish plaited narrow leaves. Flowers in dense spikes, having a funnel-shaped perianth with a straight long, or rarely short, tube and more or less equal or unequal and spreading lobes. Filaments free.

Culture and Propagation. — Many of the Babianas have fragrant blossoms with rich and brilliant colours that make them very desirable border plants. In height and foliage they are all very similar, and rarely exceed 1 ft. high. They are very often grown in pots for greenhouse decoration, but if treated as recommended for Ixias at p. 944 they may be successfully grown out of doors. As may be seen from their proximity to Ixia in this work, they are nearly related, not only botanically, but also in their requirements. The best Babianas to grow are *disticha*, with pale blue flowers scented like Hyacinths; *plicata*, with violet-blue flowers emitting a very fragrant Clove-Carnation-like perfume; *ringens*, a handsome form with irregular gaping scarlet flowers; *stricta*, with 3 outer segments white, and 3 inner ones lilac-blue with a dark blotch at the base; its variety *angustifolia* has fragrant bright blue flowers tinged with pink in the tube; the variety *rubro-cyanea* has beautiful flowers 2 in. or more across, the upper portion of the perianth being brilliant blue, the lower portion deep crimson forming a central zone; the variety *sulphurea* (also known as *Gladiolus sulphureus* and *G. plicatus*) has creamy or pale yellow blossoms; while *villosa* has brilliant crimson flowers with violet-blue anthers to the stamens.

All the Babianas bloom about May and June.

CROCOSMA.—This genus contains only the following species:—

C. aurea (*Tritonia aurea*).—A charming S. African plant with fibrous-coated slender corms or bulbs and narrow sword-shaped leaves about 1 ft. long, sheathing at the base of the slightly winged stems about 2 ft. high. The brilliant orange-red starry flowers appear during the summer and autumn months, the perianth having a cylindrical incurved slender tube and nearly oblong lobes.

Culture and Propagation. — This plant is far better known as *Tritonia aurea* in gardens. It is not infrequently cultivated in greenhouses, but in the more favourable parts of the British Islands it is amenable to outdoor treatment and makes a charming border flower, useful for cutting. A light rich loamy soil with the addition of peat and leaf mould suits it very well, and in favourable spots it rapidly spreads. In such places the plants may remain undisturbed for two or three seasons, merely covering them with a layer of leaves or litter during hard frosts. In colder localities, however, it is better to lift the corms when the leaves have withered or begun to wither—say about the middle of November—and store them in sand, or better still pot them up, as they do not like being 'dried off' too much. They may be replanted in the spring, when the young offsets may be detached and grown by themselves until large enough for making clumps in the border.

Seeds may be sown in cold frames as soon as ripe, and grown for a year before putting outside. Separation of the corms, however, is an easier and quicker method of increase.

TRITONIA. — This genus of South African plants with fibrous-coated corms or bulbs now includes the plants so well known in gardens under the name of *Montbretia.* The leaves are narrow linear sword-like and often sickle-shaped. The flowers are borne in graceful nodding spikes, each one sessile in a spathe. Perianth tube slender, straight, sometimes very short, sometimes elongated, rarely loosely incurved at the apex, with a more or less regular or slightly oblique, concave, or broadly bell-shaped limb. Filaments free.

Culture and Propagation. — The cultural treatment of the Tritonias is practically the same as that recommended above for *Crocosma.* The following are the kinds best adapted for the hardy flower garden.

T. crocata (*Ixia crocata; Gladiolus crocatus*).—A pretty species with broadly sword-shaped curved leaves, and a roundish flexuous leafy scape about 2 ft. long, bearing a distichous spike of bell-shaped saffron or orange-coloured flowers in June. There is a good deal of variation in the flowers, some being much paler and some much brighter in colour than others and spotted with yellow, red, or brown.

Culture &c. as above.

T. crocosmiæflora (*Montbretia aureo-Pottsi*). — A charming hybrid between *T. Pottsi* and *Crocosma aurea*, resembling a Gladiolus in growth, and reaching a height of 2–2½ ft. The brilliant orange-scarlet funnel-shaped flowers about 1½ in. long are produced in great abundance from about the middle of July, until cut down by hard frosts, and are borne on branched leafy stems. This hybrid when grown under favourable conditions is a far finer plant than either of its parents. The flower spikes are very ornamental for vases, bouquets &c.

Culture &c. as above.

T. Pottsi (*Montbretia Pottsi*). — A beautiful species 3–4 ft. high, with narrow tapering sword-like leaves 1½–2 ft. long in a distichous rosette at the base of the stem. The funnel-shaped flowers appear in August in slender gracefully nodding spikes, and are of a bright yellow suffused with red. Excellent for cutting. The variety *grandiflora* has larger and finer flowers than the type and is a great improvement on it. There are a large number of forms in cultivation of both *T. Pottsi* and *T. crocosmiæflora*, chiefly differing in the brilliancy of colour. *T. miniata* is a dwarf beautiful scarlet-flowered species.

Culture &c. as above.

SPARAXIS. — A genus containing about 5 species of graceful perennials with fibrous-coated bulbs or corms, simple or slightly branched stems, and few flat sword-shaped or broadly linear, erect or sickle-like leaves. Flowers with a somewhat bell-shaped perianth cut into 6 erect or spreading, more or less equal segments. Stamens attached to the base of the tube. Ovary 3-celled, becoming an ovoid or oblong membranous capsule with numerous seeds when ripe.

Culture and Propagation. — The species described below are best known, but they are only worth cultivation in the open air in the mildest parts of the kingdom. They require practically the same treatment as the Ixias (see p. 944), and should be planted in well-drained sandy loam in warm sunny situations, and in bold masses to produce an effect. During the winter they should be protected from frost and cold rains by a covering of leaves, litter &c., or a handlight. They may be increased by separating the offsets from the old bulbs when the leaves have begun to wither.

S. grandiflora. — A pretty South African bulbous plant with lance-shaped pointed leaves arranged in two rows, and reaching a height of 1–2 ft. Flowers in April and May, deep violet-purple, white or variegated, often with a deeper coloured blotch at the base of the oblong wedge-shaped segments. There are several forms of this species.

Culture &c. as above.

S. tricolor. — Another pretty South African species resembling *S. grandiflora* in appearance but having rich orange-red blossoms with a yellow centre and a purple-brown triangular blotch at the base of the segments. The flowers appear in May and June, usually before those of the preceding species. There are several forms known varying chiefly in colour, some being white suffused with rose, others bright rose or purple with a yellowish centre and deeper coloured blotches.

Culture &c. as above.

GLADIOLŬS' (CORN FLAG; SWORD LILY).—This genus consists of beautiful plants having fibrous-coated corms (usually called bulbs), sword-like plaited or ribbed leaves, and one-sided spikes of flowers. The perianth is more or less incurved, with a very short or elongated tube, obliquely funnel-shaped, more or less dilated at the throat, and having unequal lobes, the 3 upper ones usually larger than the others, erect, convex or incurved, the 3 lower ones often spotted or blotched, usually narrowed at the base, sometimes clawed. Filaments free.

Such are the main characters of the natural species of Gladiolus, but in the gorgeous hybrids now so popular in gardens a good deal of modification, chiefly in size, has taken place, and it would perhaps be difficult for the uninitiated to recognise any relationship between the hybrid forms of *gandavensis*, *Lemoinei*, *nanceianus* and *Childsi*, and the natural species from which they have been derived.

Culture and Propagation.—Although the wild types cannot compare in size, brilliancy, or effect with their descendants, many of them are nevertheless well worth a place in the flower garden. They flourish in warm sunny parts of the garden and prefer a rather stiff loamy soil to any other. Like all plants with bulbs or corms they dislike stagnant moisture at the root, and one of the most important points in their cultivation is to see that the soil is well drained. Wherever Strawberries and Roses grow freely and well, in such soil also will the Gladiolus as a rule thrive. Although the ground may be enriched with manure it is not wise to allow the corms to be in direct contact with it. The manure should be at least 9 in. below the surface of the soil, and as the corms are planted at a depth of 4–6 in., they are thus well above it.

The multiplication of the Gladiolus is an easy process. The old corms produce a number of offsets in the same way as the *Crocus*, *Babiana*, *Crocosma* and *Tritonia*, and by detaching these when the corms are lifted in autumn or as soon as the leaves begin to turn yellow, a fresh supply of plants is obtained.

Seeds may also be sown as soon as ripe or in early spring under slight protection, and about the third year flowering corms will be produced. Where however seed saving is not a consideration, it is wise for the sake of strengthening the corms underground to cut off the flower spikes as soon as over. The nourishment that would thus go to feed the ripening seeds is drafted into the corms instead.

Out of about 90, the following is a list of the best natural species of Gladiolus for the flower garden. I have considered it best to keep them separate from the Hybrid Gladioli which form a distinct group requiring special notice (see p. 949).

Except where otherwise stated they are natives of S. Africa.

G. blandus.—A splendid species 6–24 in. high, with ribbed sword-like leaves. Flowers in June, 3–10 on a scape, large, white with red markings and a yellow tube shorter than the spathe.

Culture &c. as above.

G. byzantinus. — A native of Turkey and Asia Minor about 2 ft. high with deep green narrow leaves and spikes of beautiful red flowers produced in June, often shaded with reddish-violet or purple.

Culture &c. as above.

G. cardinalis.—A pretty species 3–4 ft. high with many-nerved sword-like leaves, and branched spikes of fine scarlet flowers, produced in July and August, the 3 lower segments of the perianth each having a large white blotch in the centre.

This species is somewhat tender, and if left in the ground during the winter months should be protected from frost by means of leaves, straw &c., and also from excessive wet.

Culture &c. as above.

G. communis.—A native of S. Europe 1½–2 ft. high, with linear lance-shaped ribbed leaves and bright rosy flowers borne on a graceful nodding spike well above the foliage during the early summer months. There is some variation in the flowers, and white, purplish-rose, and reddish-purple forms exist.

Culture &c. as above. As the individual flowers of this species are among the smallest in the genus, it is more effective grown in large masses than as solitary plants or small tufts. It is very hardy and increases rapidly in favourable soils, and its cut flowers are excellent for decorative purposes. The corms need not be disturbed for 2 or 3 years, and may be replanted from October to December.

The following European and Asiatic species may be grown in the same way as *G. communis*: viz. *anatolicus*, *atroviolaceus*, *armeniacus*, *illyricus*, *insignis*, *kotschyanus*, and *palustris*.

G. cruentus.—A native of Natal with linear sword-shaped leaves 12–18 in. long. The flowers are produced about September in dense spikes 6–10 in. long, on stems 2–3 ft. high. They are about 4 in. across, of a brilliant scarlet, and yellowish-white speckled with red at the base, the two lateral segments being marked with white.

Culture &c. as above.

G. cuspidatus. — A very fine species with sword-like leaves a little shorter than the flower stem, which is 2–3 ft. high, and in May and June bears masses of beautiful flowers, rather variable in colour, but usually marked with purple and red on the lower segments.

Culture &c. as above.

G. dracocephalus. — A fine distinct species with pale green leaves 6–12 in. long, and stout roundish flower stems 12–18 in. high, bearing in August soft yellowish flowers striped with dull purple, the lower segments being green and spotted with purple.

Culture &c. as above.

G. floribundus.—A pretty and useful species with strongly veined leaves and stems about 1 ft. high, bearing flowers almost from base to apex in early summer. The blooms are large and vary a good deal in colour from white with a broad purplish stripe to bright flesh colour with deep red, in contrast with which are the dark violet anthers. The cut spikes are valuable for decorations. Closely related to this species, either as varieties or hybrids, are the plants known in gardens as *formosissimus*, having clear orange-red flowers with white blotches, washed with lake and bordered with crimson; *insignis*, vermilion blotched with carmine; *magnificus*, carmine-rose and vermilion-red blotched with white; *Queen Victoria*, bright velvety red blotched with white and edged with carmine; and *trimaculatus* (of gardens), bright rose, spotted with carmine and white.

Culture and Propagation.—The typical *G. floribundus* does not usually produce offsets from the old corms so freely as other species of Gladiolus, and for this reason it is often raised from seed. The latter are sown as soon as ripe in sandy soil in cold frames, pans or boxes, or in spring in the same way, or in the open border. The seedlings are not disturbed for the first year, but protected from frosts during the winter. The young corms may be lifted in autumn when the leaves are withered, and stored until about March or April when they may be planted out. About the end of the third, or at most the fourth, year from the time of sowing the seeds, the flowers appear.

G. psittacinus (*G. natalensis*). — A beautiful species with tufts of distichous sword-like leaves a foot or more long and stout erect flower stems about 3 ft. high. The large bell-shaped flowers 10–12 on a spike are rich scarlet, lined and spotted with yellow, with a greenish tube purple-striped. This is one of the original parents of the *Gandavensis* hybrids described below. Plant the corms in March and April.

Culture &c. as above, p. 947.

G. purpureo-auratus. — A fine species from Natal with broad and firm glaucous-green leaves about 18 in. long. The flower-stem is 3–4 ft. high, at first upright, then arched on a level with the lower flowers. The latter are borne in August, funnel-shaped, pale sulphur-yellow with a large purple blotch on the two lower segments. There are 12–15 flowers on a spike opening from the bottom upwards 2–3 at a time.

Culture and Propagation.—A peculiarity of this species is that its rather small corms, about 1 in. across, instead of developing young corms around the old ones, send out runners 2–3 in. long at the end of which the new corms are developed. By this means if left in the ground for two or three years large masses of the plant may be obtained.

This species fertilised with the pollen of *G. gandavensis* produced the beautiful *Lemoinei* hybrids.

G. Saundersi. — A beautiful species with strongly nerved sword-like leaves 2–3 ft. long, and flower stems about the same height, bearing in autumn spikes of 6–12 flowers over 3 in. across, and of a beautiful crimson or pale scarlet spotted with pink and white, and having conspicuous yellow anthers in the centre.

Culture &c. as above. This species is very shy in producing fertile seeds. The corms should be planted about March and April.

G. segetum. — A handsome species, native of the Mediterranean region, and growing 1½–3 ft. high. It has narrow sword-shaped leaves about 18 in. long, and produces its pinky-rose or purple-red flowers in June and July, the three lower and smaller segments having a white blotch at the base.

Culture &c. as above. This species flourishes in any good garden soil, and if grown in bold masses is very attractive when in bloom. It likes warm sunny positions and may be left without lifting for several seasons, in which case a mulching in autumn will benefit it.

G. tristis.—A native of Natal about 1 ft. high, the leaves having long cylindrical spathes below, and bearing in July funnel-shaped flowers 2–3 in. deep, with a yellow ground colour, the 3 upper segments of the perianth being minutely spotted with reddish-brown on both surfaces, the 3 lower ones spotted only on the outer half. The plant known as *sulphureus* is a pale yellow self-coloured form of the type with a graceful habit.

Culture &c. as above. This species is mentioned chiefly as having been one of the parents of the well-known *Gladiolus Colvillei*, and its variety. It flourishes in warm positions in ordinary good garden soil.

HYBRID GLADIOLUS.—The hybrid Gladioli, owing to their great beauty, size and range of colour, have completely displaced the natural species except in botanic gardens. In addition to their beautiful blossoms they possess a hardy constitution, and produce an abundance of bloom from spring till the end of autumn. The most showy kinds are those belonging to the *gandavensis*, *Lemoinei*, *nanceianus* and *Childsi* groups, each of which will be dealt with separately.

G. brenchleyensis. — This brilliant scarlet Gladiolus is one of the best known in British gardens. It was raised about the year 1848 at Brenchley by Mr. Hooker, and is practically a form of *gandavensis*. It however retains its character so well, and is so unlike the usual *gandavensis* which have the blood of more than two species in them, that it may well receive separate mention. Its cultural requirements are, however, the same, but as the flower spikes which appear before those of *gandavensis* are not nearly so heavy and support themselves naturally very well, it is not so essential to detract from their natural grace by the addition of stakes.

G. Childsi. — The hybrids of this group are among the finest, hardiest, and most free-flowering in cultivation. They were first raised by Herr Max Leichtlin of Baden-Baden, in 1882, who selected the best varieties of *G. gandavensis* and crossed them with *G. Saundersi*. Under the name of *turicensis* the same hybrid was obtained by Herr Frœbel of Zurich, but the latter name has never become established. In growth the *Childsi* Gladiolus are very rank and vigorous, having dark green foliage, and often attaining a height of 4–5 ft. with spikes of bloom over 2 ft. in length. They branch freely, each main stem often producing three or four spikes of bloom. This shows a trace of the blood from the *ramosus* section which seems to be continued in many of the *gandavensis* hybrids. The individual flowers of the *Childsi* hybrids are of great substance, and often measure 7–9 inches across. In colour they are unsurpassed by any other section and have various delicate shades, markings, and blendings of blue-grey, purple, scarlet, salmon, crimson, rose-white, pink, yellow &c., often beautifully mottled and blotched in the throat. Named varieties appear in the trade catalogues, but as new ones appear every year and the older ones drop out of sight it is scarcely worth while to waste space here with a string of mere names.

For beds and borders and groups on the grass *G. Childsi* is very effective.

Culture and Propagation. — This is the same as that described below under *G. gandavensis.*

G. Colvillei. — A beautiful hybrid between *G. cardinalis* and *G. tristis*, having showy crimson-purple flowers flaked with white. It grows about 2 ft. high and is excellent for massing in borders or beds. The flowers are very valuable for cutting. There are two white forms known, one *albus* with white flowers and red stamens, the other having white flowers and white stamens, known as 'The Bride.'

Culture and Propagation.—Immense numbers of these white forms are imported from Holland every year, and grown for the London and other markets. They flourish in rich light soil and not too sunny situations, but with a free circulation of air, and protection from cold winds. The corms may be planted any time from the end of October to January about 4–5 in. deep. A protection with litter or the remains of a spent mushroom bed during the winter will be beneficial, and the flowers will appear from May to July according to the time of planting. Grown in pots *G. Colvillei* and its varieties are excellent for the winter decoration of greenhouses and conservatories.

G. gandavensis. — What is popularly known as the Ghent Gladiolus originated in 1837 by M. Beddinghaus, gardener to the Duc d'Aremberg, at Enghien, crossing *G. psittacinus* and *G. cardinalis.* There can, however, be little doubt that before the *gandavensis* type had become fairly fixed the services of other species were brought into force, and the most likely of these were *oppositiflorus* (which shows in the white forms), *blandus* and *ramosus.* Other species may also have been used, but in any case the *gandavensis* Gladiolus as we now know it is the result of much crossing and intercrossing between the best forms as they were developed. M. Souchet of Fontainebleau was one of the earliest to take to the serious business of producing *gandavensis* hybrids. He used the hybrids obtained from *cardinalis* and *psittacinus*, and crossed them with *blandus* and *ramosus*, and in 1852 many of them bloomed for the first time in his garden, and were a vast improvement on the original type. About 5 years later—in 1857—the late Mr. James Kelway of Langport began operations in hybridising plants of this section, and down to the present day his firm is noted for the many very beautiful forms produced. Mr. Standish of Ascot was another early hybridiser of these plants. About 3000 named varieties have appeared since those days, but the vast majority are now sunk in oblivion—a fate no doubt in store for those at present causing a sensation, when they too make way for still further improvements. As every nurseryman invents the names of his pets it would be useless giving a string of them here, but it may be remarked that the prevailing colours of the *gandavensis* Gladioli are exquisite and delicate, and consist of various shades and mixtures of white, cream, violet, crimson, lilac, purple, maroon, salmon-red, rose, scarlet, yellow, orange, pink, amaranth &c. variously striped and blotched.

Soil. — A light sandy soil has been often recommended for Gladioli, but the best and most successful growers prefer a stiff loamy soil, well drained and deeply dug, such as would suit Roses. Other soils of a lighter nature will produce excellent *Gladioli*, and in wet cold localities such soils may be more suitable than the stiffish loam recommended.

Where Gladioli are grown extensively a dressing of stable or cow manure may be deeply dug into the soil in September or October. The land may then be left in a rough state to be sweetened by the frosts and rains until about the beginning of March, when the surface may be levelled with a hoe, which is better than a rake for this particular purpose.

Planting.—Planting may then commence, but is best deferred unless the ground is in a friable condition and not in a wet sticky state. The drills into which the corms are put should be about a foot apart and about 4–5 in.

deep. Some excellent growers like the Rev. H. D'ombrain prepare the corms by peeling off the outer coat and cutting each one in two with a sharp knife, each portion containing an 'eye' or bud. Some powdered charcoal or charred vegetable refuse is placed round the cut corms, which are planted about 5 in. apart or more according to the space at disposal, but it is a matter of small importance, as the roots do not spread but go straight down into the soil. Some growers object to cutting the corms, fearing an attack of disease, but there is no more danger in the process than in cutting up Potatoes at planting time.

After the corms have been covered and beds levelled over they will require little attention beyond weeding until the flower stems appear about July and August. Stakes must then be used, but should not reach higher than the lowest flower, and one strong tie will be sufficient to prevent the flower spikes from being blown about by the wind. If the blooms are required for exhibition, it is wiser to stake each spike separately. Should the summer be very hot and dry, a good mulching of decayed manure and copious waterings will benefit the plants immensely.

Hybridising. — If seeds are not required it is better for the constitution and vigour of the corms that the flower spikes should be cut off as soon as they begin to wither. When it is intended to raise hybrids, however, the flowers must be left on, and only those of the finest form, colour, and substance selected for fertilising purposes. The article on hybridising at p. 87 will explain the process of conveying the pollen from the stamens to the stigma of the pistil. Hot bright sunny days when the air is dry should be chosen for fertilising the flowers, and an hour or two before mid-day is the most favourable time according to Mr. Kelway. The fertilised flowers should be marked in some way with a piece of coloured string or a label, but it is scarcely worth while recording the parentage of Gladiolus hybrids except when pure species are employed.

Seed-sowing. — The seed should be gathered when fully ripe and kept in a dry airy place until the first week in April. It may then be sown in a piece of ground which has been prepared in the autumn and brought into good tilth. The surface should be raked over and rendered as fine as possible. The seeds are sown in shallow drills about ½ in. deep, and 6 in. apart, and covered with a mixture of fine sifted soil and sand. The seed beds are then pressed down evenly and firmly, and kept free from weeds with an occasional watering. The seedlings come through the soil like Barley and about September may be lifted and stored until planting time in spring.

Harvesting. — The disappearance of the flowers and the withering of the leaves are signs of maturity and a hint that the corms may be lifted. About the end of October or beginning of November is the best time to take them up. They may be stored in a dry airy place free from frost until the planting time in March. The young corms or 'spawn' formed at the base of the adult corms may be detached and stored in the same way, and sown like seeds in drills in April, but they require to be covered with about 2 in. of soil. In September, before the foliage has withered, they may be lifted and cleansed, and again stored until the following season. During the first season of growth all flower spikes should be pinched off and not allowed to develop so that the corms may become stronger.

G. Lemoinei. — This beautiful race of Gladiolus was produced by M. Lemoine of Nancy, France, by fertilising flowers of *G. purpureo-auratus* with pollen from the most beautiful forms of *gandavensis.* As the latter has the blood of four or five species in its veins, it follows that the Lemoinei hybrids contain the blood of at least one more species. The first flower appeared in 1877, but the plants were not put into commerce until 1880. During the past twenty years a large number of choice varieties have been developed not only by M. Lemoine but by Messrs. Kelway and other growers in England and on the Continent, and there is now a very large and varied assortment in gardens. The Lemoinei hybrids are distinguished by a large beautiful golden-yellow blotch with borders of purple, scarlet, maroon &c. on the lower segments, which render them very attractive. There are many shades of colour, including carmine, rosy-purple, sulphur, salmon, yellow, creamy-white, blood-red &c., more or less beautifully blended. The first varieties raised were named *Lemoinei*, a pale salmon-pink, and *Marie Lemoine*, a straw-white, and these and many others are still grown. They are vigorous growers and free bloomers, and produce their flowers between the early and the very late kinds.

Culture and Propagation. — This is the same as for the *gandavensis* hybrids referred to above.

G. nanceianus.—This race of hybrids was also raised by M. Lemoine of Nancy, and distributed in gardens for the first time in 1889. The plants surpass in size and beauty all other kinds except the *Childsi* race. They differ from the latter in being the result of crossing *G. Saundersi* with the best forms of *Lemoinei*, instead of *gandavensis*. They are as hardy as the *gandavensis* section and much more free-flowering, having enormous branched spikes of bloom, many of which are 5 in. or more across. The colours are of the most brilliant and varied hues, heavily spotted, and having a beautiful lustrous stem. Among the shades of colour may be mentioned purple, claret, orange, red, maroon, orange-scarlet, violet, carmine, variously striped and blotched with distinct and harmonising colours.

Culture and Propagation.—This is the same as for the *gandavensis* hybrids.

G. nanus.—This section is valued on account of its dwarf habit and free-flowering properties, and is useful for cutting. The corms are best planted from October to December, in the same way as the *Colvillei* varieties, and during severe frost should be protected with a covering of straw, litter &c. The flowers vary in colour from white through rose, pink, carmine, orange, salmon, and are often beautifully blotched.

G. ramosus. — There are several hybrids in this section, but they cannot compare in size or colour with those of the *gandavensis*, *Lemoinei*, *Childsi*, and *nanceianus* sections. The flowers are for the most part shades of deep rose or red, more or less flaked and feathered with white, but of great substance. The corms may be planted in spring like the more showy kinds, and the flowers are produced from about July to late in autumn.

Culture and Propagation.—This is the same as for *G. floribundus* (p. 948).

ANTHOLYZA. — A genus of plants with Gladiolus-like corms and leaves and spikes of bright-coloured flowers overtopping the foliage. Perianth tubular with 6 unequal segments, the upper arching ones being much longer than the others. Stamens free.

Culture and Propagation.—The plants of this genus are rarely met with except in botanical collections. They flourish in warm sunny spots out of doors in stiffish well-drained loamy soil with a little peat and leaf mould. They may be treated the same as the species of *Gladiolus*, *Tritonia* (p. 946) and *Watsonia* (p. 945), and increased in the same way by offsets or seeds.

They are all natives of South Africa, and as they resemble each other very much in habit and foliage it is scarcely necessary to describe these in detail. The best kinds for gardens are:—

A. æthiopica (*A. floribunda; A. prœalta*), which grows about 8 ft. high, and produces spikes of scarlet and green flowers in June. The variety *ringens* (*A. vittigera*) has orange-red flowers, smaller than those of the type, borne on plum-purple stems with a 'bloom.'

A. caffra (*Anisanthus splendens*), a showy species about 2 ft. high, with spikes of rich scarlet flowers appearing in June.

A. Cunonia (*A. bicolor; Anisanthus Cunonia*), with scarlet and black flowers; *A. carolina*, bright orange; *A. fulgens*, rich coppery rose; and *A. paniculata*, with panicles of red, brown, and yellow flowers, are other species worth growing.

Division II. *SPADICIFLORÆ* (see p. 128).

CXXIV. TYPHACEÆ—Reed Mace Order

A small order of marsh or water-loving plants with a creeping rootstock, narrow linear obtuse leaves with sheathing bases, and monœcious flowers in cylindric oblong or roundish spikes or heads, the male flowers uppermost. Perianth none, or reduced to scales or hairs. Stamens few or many. Fruit dry or fleshy, 1-celled and 1-seeded.

TYPHA latifolia (*Reed Mace*, *Cat's Tail* or *Club Rush*) is a well-known and attractive native plant found by the banks of lakes, rivers &c., growing in masses. It has blunt linear flattish leaves 3–6 ft. long and 1–2 in. broad, with a somewhat glaucous hue, and arranged in a distichous or 2-ranked manner. The round flower stems spring up in July and August from the centre of the tufts to a height of 3–7 ft., bearing dark purple-brown spikes 6–12 in. long, and about 1 in. in diameter, giving the whole a handsome and attractive appearance. In many parts this species is called the Bulrush, a name properly belonging to *Scirpus lacustris*, see p. 972.

T. angustifolia is similar to *T. latifolia*, but is smaller in all its parts. The leaves are shorter and narrower, and channelled towards the base, and the spikes, which appear in July, are often interrupted.

Culture &c. as below.

SPARGANIUM ramosum (the *Bur Reed*) is another native plant belonging to this order, and inhabits ponds, ditches, river-banks &c. Its erect 3-sided leaves are 2–5 ft. long and about 1 in. broad, while the flower stems, with roundish olive-brown male heads ½–¾ in. through, appear in June and July, and are 1–4 ft. high, the female flowers as large as the males when in fruit. *S. simplex* is another common species, with yellow flower-heads.

Culture and Propagation.—All these plants may be used on the edges of ponds, lakes &c., and are easily increased by division. When grown in masses they give a picturesque appearance to the surroundings.

CXXV. AROIDEÆ—Arum Lily Order

An order of plants with tuberous rootstocks, large radical usually net-veined leaves, and unisexual or hermaphrodite flowers borne on a spadix, enclosed or protected by a spathe and often very fetid-smelling. Perianth none, or composed of 4–8 hypogynous segments. Stamens few or many. Fruit a one- or more celled, and one- or more seeded berry.

ARUM (CUCKOO PINT; LORDS AND LADIES).—A genus of erect or dwarf perennials with thick rootstocks and pedate or hastate radical leaves. Flowers unisexual, clustered on the lower part of a club-shaped spadix; female flowers below and separated from the males by barren or rudimentary ones. Spathe large, convolute. Berry fleshy.

Culture and Propagation. — The hardy Arums grow in ordinary good garden soil in moist shady or sunny spots, and may be grown in the wilder or rougher parts of the garden. They are very curious and interesting, but some of them, like *A. crinitum*, emit a strong and disagreeable odour when in bloom. They are increased by offsets from the rootstocks after the leaves have withered, which is the best time for disturbing the plants.

Seeds may also be sown when ripe in pots or pans of light well-drained soil when they have been cleaned from the sticky flesh surrounding them. It takes a long time, however, to raise plants by this means.

Notwithstanding the unpleasant odour arising from some of these plants when in bloom, they are very ornamental in appearance, the foliage alone being a great attraction.

A. crinitum (*Helicodiceros crinitus*). *Dragon's Mouth.*—A highly curious and evil-smelling Corsican plant 1–1½ ft. high, with pedately lobed leaves, and a cylindrical drooping hairy spadix of dark purple-brown flowers, enveloped by a large ovate flat brownish spathe, heavily blotched with purple, and hairy inside. The flowers are produced in May and June.

Culture &c. as above. This species

requires to be grown in warm sheltered spots in borders or shrubberies.

A. Dracunculus (*Dracunculus vulgaris*).—*Dragon Plant.*—A native of S. Europe 2–3 ft. high, with pedately lobed leaves and fleshy stalks and stems, mottled with black. The flowers appear in June and July on an erect brownish-red tapering spadix, issuing from a large ovate-lance-shaped spathe contracted at the base, and of a rich deep purple or claret colour on the inner surface.

Culture &c. as above. This plant has a very disagreeable odour when in bloom. It flourishes in sandy soil in a warm border. Increased by offsets.

A. italicum.—A native of the Channel Islands, S. England, and S. Europe. It grows 9–24 in. high, with triangular-hastate leaves appearing before winter. The flowers appear in spring on a creamy-white or yellowish spadix, enclosed in a hooded greenish-yellow or whitish spathe. In autumn when the leaves have withered the clusters of scarlet berries on the stems are very beautiful and attractive. This species may be naturalised in grassy places or shrubberies, and increased by seeds or offsets. The variety *marmoratum* has the leaves blotched or marbled with yellow.

Culture &c. as above.

A. maculatum.—This is our common Lords and Ladies or Cuckoo Pint found in woods, hedges, and dry ditches in most parts of the country. It has hastate-cordate leaves often spotted with black, and yellowish-green spathes, edged and often spotted with purple, enclosing a dull purple or rarely yellow club-shaped spathe. In autumn the bright scarlet berries look very handsome.

Culture &c. as above. Useful for naturalising in waste places. Increased by offsets and seeds.

A. palæstinum (*A. sanctum*).—A very attractive species, native of Palestine, and very much resembling the white and well-known Arum Lily in foliage and appearance. The large bright shining green leaves are hastate in shape, and the flower stems are thrown well above the foliage in early summer. The spathe is 6–8 in. long, greenish-yellow washed with red outside, but deep almost blackish velvety purple on the inner surface. From the centre springs a blackish spadix about 6–8 in. long and rather thicker than an ordinary penholder.

Culture &c. as above. This species requires protection with a covering of leaves &c. in winter, and may be grown in warm situations such as under a south wall. It likes sandy loam and leaf-soil, and excellent drainage, as stagnant moisture at the root in winter is likely to rot the tubers.

ACORUS (SWEET FLAG).—A small genus of herbaceous plants with creeping rootstocks and radical sword-shaped leaves. Spathe continuous with the flattened scape. Spadix lateral, round, narrowed upwards. Perianth segments 6, free. Stamens 6, with flattened filaments.

Culture and Propagation.—The Sweet Flags flourish in a moist soil or by the edges of ponds, lakes, ditches, and even in shallow water. They are easily increased by division of the rootstocks in spring.

A. Calamus.—A British marsh or water plant with cylindrical, channelled and very fragrant roots and erect, sword-shaped leaves 3–6 ft. long, with thick midribs and wavy margins. Flowers yellowish, borne in June and July on a curved spadix 3–6 in. long. There is a pretty form having golden stripes down the leaves.

Culture &c. as above.

A. gramineus.—This is a Chinese species with a slender creeping rootstock and tufts of grassy leaves 4–6 in. long. The variety ***variegatus*** in which the leaves are striped with white is very handsome.

Culture &c. as above.

PELTANDRA (ARROW ARUM).—A small genus of marshy perennials with slender rootstocks and somewhat peltate hastate leaves with long sheathing stalks. The flowers are densely crowded on a slender, erect, cylindrical spadix, protected by a convolute spathe with wavy margins.

P. virginica (*Caladium virginicum*). A North American marsh plant chiefly valuable for its ornamental large green sagittate leaves with netted veins near the edges. The plant grows 2–3 ft. high, and flowers in July.

Culture &c. as above for the Sweet Flags. It may be planted at the edge of ponds, lakes, streams &c. in sunny sheltered places.

RICHARDIA (ARUM LILY).—A small genus of perennial plants with thick fleshy rootstocks, large sagittate leaves, and monœcious flowers borne on an erect cylindrical spadix enclosed by a large and ornamental funnel-shaped spathe.

R. africana (*R. æthiopica; Calla æthiopica*). — This is the well-known White Arum or Trumpet Lily, or Lily of the Nile, grown so much in greenhouses that most people are unaware of its hardiness. It is a native of S. Africa, and notwithstanding its popular name of Lily of the Nile is not found growing on the banks of that historic river.

Culture and Propagation.—In the mild southern parts of England and Ireland it may easily be grown out of doors, planted in shallow water, or near the edges of pools in sheltered sunny places, where it produces masses of ornamental leaves on stalks 1–2 ft. high, and the beautiful white spathes well above them, during the summer months. The tuberous rootstocks are safest planted about a foot below the surface of the water, as they are thus protected from frost in severe winters. The variety called 'Little Gem' is very distinct, being about half the size of the type in both leaves and spathes.

The readiest means of increasing Arum Lilies is by detaching the offsets from the tuberous rootstocks when the leaves have begun to wither. The resting period is not of long duration and the offsets and old tubers are best re-planted immediately after being disturbed.

CALLA palustris (*Bog Arum*).—A pretty little aquatic plant about 6 in. high, native of the Northern Hemisphere. It has creeping rootstocks and smooth deep green heart-shaped leaves. The male and female flowers, which are on the same spadix, appear in May and June, and are protected by a pure white spathe, the outer surface of which is tinged with yellow.

Culture and Propagation.—May be grown in marshy places like *Orontium*; easily increased by dividing the roots.

ORONTIUM.—A genus with only one species:—

O. aquaticum (*Golden Club*).—A pretty N. American water-plant 12–18 in. high, with long-stalked oblong or elliptic leaves, which float on the surface of the water. In May and June the hermaphrodite yellow flowers appear on a slender club-like spadix and emit a peculiar odour. The upper flowers have a 4-parted perianth, the lower ones a 6-parted one. Stamens 4 or 6. Ovary 1-celled, becoming a membranous utricle when ripe.

Culture and Propagation. — This peculiar plant will flourish on the margins of lakes, streams &c., or in boggy or marshy soil, and may be increased by dividing the rhizomes in spring. When planted in water they should be 6–12 in. beneath the surface.

LYSICHITUM.—A genus containing only one species:—

L. camtschatense. — A noble-looking Aroid, native of the swamps of Northern Asia and America. It is a stemless plant, throwing up large oblong lance-shaped acute leaves 1–2 ft. in length, and 8–10 in. across, from a thick horizontal rootstock. The leaves are sometimes spotted or mottled like those of the Dieffenbachia, a tropical relative. The stout flower stalk is 6-12 in. high, and bears a spathe with a broad sharp-pointed blade, and a spadix 3–4 in. long. The flowers on the spadix are hermaphrodite and all fertile. Perianth segments 4, oblong. Stamens 4.

Culture and Propagation.—A figure of this plant is given in the 'Gardeners' Chronicle,' April 7, 1900. It is not yet in cultivation, but would doubtless prove to be perfectly hardy in marshy parts of the rockery, or near the banks of lakes, pools, streams &c. It would probably produce seeds freely in our climate, and by this means could be readily increased.

The Skunk Cabbage (*Symplocarpus fœtidus*) is closely related and may be grown in the same way. It has bronzy-purple spathes marbled with green.

CXXVI. PALMÆ—Palm Order

A natural order containing more than 1000 species of more or less arboreous plants remarkable for their stately and elegant appearance, and called by Linnæus 'Princes of the Vegetable Kingdom.' With the single exception described below they are all too tender to be grown out of doors permanently in the British Islands, although a large number of them will grow well in large cool conservatories. There is great variation in the habit of growth, some having simple tree-like trunks, others being apparently stemless with the leaves springing direct from the soil; others again with slender erect or climbing stems of great length, while many kinds are furnished with spines and prickles. The leaves are usually large and elegant in appearance, and may be fan-shaped, plaited, pinnate, or variously divided. The flowers are small, regular, hermaphrodite, monœcious, diœcious, or sometimes polygamous, and are usually borne in great numbers on branching stems issuing from a large leafy spathe or bract. Each flower has 3 free or united sepals and petals, and usually 6 stamens in the hermaphrodite and male blossoms, but in rare cases there are as many as 50.

Although unsuitable for outdoor cultivation it may be mentioned here that the Date Palm (*Phœnix dactylifera*) and the Coco-nut Palm (*Cocos nucifera*), both Palms valuable for the well-known fruits they produce, belong to this order, while many others are also of great economic importance. The so-called Double Coco-nut (*Lodoicea sechellarum*), a native of the Seychelle Islands, is a remarkable plant and was believed by the late General Gordon to be the tree which bore the Forbidden Fruit in the Garden of Eden. The fruit is larger than that of any other palm or plant known, often measuring 12–18 in. in length, and about a foot across. It is 2-lobed and somewhat resembles 2 fruits of the ordinary Coco-nut joined together, hence the popular name. Although many previous attempts had been made to cultivate this Palm in Europe, they all failed until a few years ago, when the large seeds were successfully sprouted at Kew and fine plants produced from them.

TRACHYCARPUS excelsus (*Chamærops excelsa*).—A graceful Palm, native of China and Japan, and attaining 10–20 ft. or more high in favourable situations. In young plants the leaves are more or less oblong in shape, but when fully developed they become split up into numerous linear pointed segments radiating fan-like from the top of the leaf-stalk, and measuring about 18 in. across. The small yellowish flowers are produced on a branching stalk or spadix about a foot long, issuing from large brownish and tubular membranous sheaths or spathes.

Culture and Propagation.—This is the only Palm that can be regarded as hardy in the British Islands, and it is recorded as having stood as much as 15° of frost without injury in various parts. It will thrive in good and well-drained garden soil, but prefers a mixture of rich loam, leaf mould and sand. It should be planted in warm positions sheltered from cold and violent winds, and is effective on the lawn by itself. It may be increased by means of seeds sown in gentle heat in spring, the young plants being grown on under glass until they are sufficiently large and sturdy enough for the open air. If suckers appear from the base they may be detached carefully, potted up and grown on in gentle heat, and kept close until established. Also well known as *Chamærops Fortunei.*

Division III. *GLUMIFLORÆ* (see p. 128).

CXXVII. GRAMINEÆ—Grass Order

A large order of tufted annual or perennial plants, shrubby or tree-like in the Bamboos, usually tufted at the base, with round or flattened simple or branched stems, usually hollow between the swollen joints. Leaves usually clustered at the base of the stems, and often distichously imbricated, the upper ones alternate, distant, sometimes spirally arranged, sheath split and usually furnished with a small scarious scale (or ligule), or tuft of hairs at its junction with the blade. Flowers hermaphrodite or unisexual, in spikes, racemes, or panicles. Flowering glumes boat-shaped, enclosing the flower and a flat, often 2-nerved, scale called a 'palea.' Stamens 3, or fewer, rarely 4 or 6, very rarely more, with versatile drooping anthers. Styles 2, or rarely 3, with feathery stigmas.

This vast order has been estimated to contain about 4500 species, but probably not more than 3500 are really distinct. Apart from the garden plants which belong to it, the order is of great importance from an economic point of view, containing as it does Wheat, Oats, Barley, Rye, Maize, Rice, Millet, and many other kinds of grain less well known, and also the Sugar Cane, which is grown extensively in the West Indies.

From a flower garden point of view the hardy Bamboos are undoubtedly the finest and most ornamental plants belonging to the Grass Family, although the Pampas Grass (*Gynerium argenteum*) as a highly ornamental plant must also be placed in the front rank. As the plants commonly known as Bamboos belong to two or three different but closely related genera, they will be kept together here for the sake of convenience, and all the other Grasses will be arranged in alphabetical order according to their genera, as they are all of a more or less tufted habit.

AGROSTIS (Bent Grass).—A genus of annual or perennial Grasses with compressed flower-spikelets in loose panicles, which are very ornamental when dried. All the species are of easy culture in ordinary garden soil, and may be raised from seeds sown in spring, or perhaps better still in September, and very slightly covered.

A. nebulosa (*A. capillaris*).—*Cloud Grass.*—A charming annual native of Spain, forming elegant tufts about 15 in. high, and light and graceful panicles of flowers which have been likened to a cloud resting over the ground, hence the popular name.

Culture &c. as above.

A. pulchella is a native of Russia, but likewise an annual, 6-12 in. high, somewhat stiffer in habit than *A. nebulosa*, but valuable for cutting for bouquets and winter decorations. *A. Spicaventi* is a British annual with large silky panicles.

Culture &c. as above.

AIRA (Hair Grass).—This genus contains a few ornamental Grasses with loose panicles of compressed spikelets, each of which has generally 2 perfect flowers, and sometimes a neutral one.

Culture and Propagation.—The plants may be raised from seeds sown in spring or autumn in the open border where wanted.

A. cæspitosa (*Deschampsia cæspitosa*) is a pretty tufted Grass 2-4 ft. high, native of our wet meadows and woods, having leathery leaves and linear oblong panicles of shining brownish or purplish spikelets in June and July. The variety *alpina* or *vivipara* has graceful panicles resembling a miniature Pampas Grass.

Culture &c. as above.

A. flexuosa (*Deschampsia flexuosa*) is known as the 'Waved Hair Grass.' It is a native plant found on heaths and in dry woods, and has erect slender shining stems 6-24 in. high, and panicles of purplish or tawny yellow spikelets from June to August. It is a pretty and elegant perennial, and may be increased by seeds or division.

Culture &c. as above.

A. pulchella.—A graceful and ornamental S. European Grass 6-8 in. high, with tufts of slender hair-like stems and delicate 'clouds' of elegant panicles, shimmering with the slightest breath of air. When dried the flowers prays last a long time and are very valuable for decorative work.

Culture &c. as above. Seeds may be sown in spring or autumn.

ANTHOXANTHUM (SWEET VERNAL GRASS).—A genus of sweet-scented Grasses, differing from most of the others in having only 2 stamens, with linear purple or yellow anthers, and long styles with feathery stigmas.

A. odoratum.—A graceful native perennial Grass with shining stems 6–18 in. high, flat hairy leaves, and downy or hairy panicles composed of green spikelets borne in May and June, and becoming dull yellow when old. It is this Grass which gives the well-known scent to new-mown hay, and when drying emits an odour resembling that of the Sweet Woodruff (*Asperula odorata*), p. 487.

Culture and Propagation.—This species may be raised from seed sown in spring or autumn, or by division of the tufts.

APERA arundinacea.—An elegant Grass, native of New Zealand. It grows 12–18 in. high, with slender stems, from which long and gracefully arching and drooping panicles of purple-brown flowers are produced in great profusion. As the panicles often droop lower than the base of the plant, this species seems to be more suitable for pot-culture, so that it can be raised on a pedestal to allow the natural weeping habit free play.

Culture and Propagation.—It may be raised from seeds, and although not yet well known, will probably prove hardy, at least in the milder parts of the country, in ordinary soil. The tufts may also be divided.

ARUNDO (REED).—A genus of ornamental Bamboo-like Grasses, easily grown in ordinary soil and preferring damp but sheltered situations. They are effective massed here and there in the lawn or pleasure ground. They are increased by dividing the creeping root-stocks, which become woody with age, and also by means of cuttings. The latter are taken about June, the ends of the large stems being cut off and placed horizontally or obliquely in a hotbed and covered with fine and very sandy soil. They are kept very moist and heavily shaded, until after a short time buds are seen to shoot from the joints, and in their turn produce roots. When well rooted the buds are detached and potted up separately, still keeping them warm, moist, and shaded, until they have become sufficiently established to bear more air and light, and a cooler atmosphere, preparatory to planting them out of doors. Seeds may also be sown in gentle heat in spring, the seedlings being grown on in the same way as the rooted cuttings.

A. conspicua.—A noble New Zealand Reed with tufts of stoutish stems 8–12 ft. high, clothed with long curving leaves, and bearing drooping racemes of silky white, green, or yellowish flowers which last for a long time in perfection.

Culture &c. as above. A rich, moist, loamy soil suits this plant best, and in the warmer parts of the country it attains its finest and most luxuriant proportions. In cold parts a protection of leaves or litter over the crowns is advisable in frosty weather.

A. Donax (*Great Reed*).—This is the giant among European Grasses. It is a native of S. Europe, and in rich moist loamy soil attains a height of 10–12 ft. Its stems or 'culms' are clothed with alternate lance-shaped glaucous-green recurved leaves. The numerous reddish spikelets become whitish with age, and form a compact panicle 12–16 in. long.

Culture &c. as above. This species requires protection in winter in the colder parts of the country. The variety *versicolor* or *variegata* only grows about 3 ft. high, but is a very ornamental and valuable garden plant. The graceful leaves are striped with white. It is a fine plant for grouping and flourishes in a deep well-drained sandy loam, but requires protection in severe winters. The stems placed in water produce shoots from the joints which may be potted up separately and grown on under glass until established.

A. Phragmites (*Phragmites communis*).—This is the common British Reed found growing near the edges of lakes &c. It has creeping jointed root-stocks, and stout stems 6–10 ft. high, clothed with flat stiffish leaves, glaucous on the under surface. The flower spikelets are borne in dense ovoid panicles in July and August, and are of an attractive purplish colour, and furnished with silky hairs.

Culture &c. as above. This species may be used for the edges of ornamental pieces of water. There is a variegated form which is handsome.

BRIZA (Quaking Grass).—A genus of pretty and graceful Grasses easily recognised by their large ovate or heart-shaped drooping spikelets borne in loose panicles.

B. maxima.—A native of S. Europe, grows about 18 in. high, with long linear tapering leaves and oblong heart-shaped spikelets of a whitish-yellow or straw colour gracefully nodding at the ends of the slender stems, during the summer months.

Culture and Propagation.—This is an annual and may be raised from seeds sown in spring or autumn in ordinary soil.

B. media.—A native perennial about 1 ft. high, with flat smooth leaves, and pyramidal panicles with very long hair-like branches from which hang green or purplish shiny spikelets ovate in shape, and midway in size between those of *B. maxima* and *B. minor.*

Culture and Propagation.—This will grow in ordinary garden soil, and may be increased by seeds or division in spring or autumn.

B. minor (*B. minima ; B. gracilis*).—*Little Quaking Grass.*—A charming little annual Grass, native of the S. of England and Ireland, Channel Islands &c., with tufted stems 4-10 in. high. The panicles with hair-like branches are covered with drooping triangular spikelets during June and July, and look very graceful.

Culture &c. as above for *B. maxima.* Increased by seeds sown in September or spring. All the Brizas are useful for cutting and drying, and give a light airy effect to bouquets and other floral decorations.

BROMUS (Brome Grass).—Only one species of this genus is generally grown for ornamental purposes, viz. *B. brizæformis.* It is an elegant biennial Grass about 2 ft. high, with drooping panicles, from which hang oblong heart-shaped spikelets on slender hairy stalks, almost as large as those of *Briza maxima.*

Culture and Propagation.—It grows readily in ordinary garden soil in warm positions, and may be raised from seeds sown in August or September for flowering the following year. The flower sprays are useful for cutting and drying in the same way as the Brizas.

DACTYLIS (Cock's Foot Grass). The variegated form of *D. glomerata* is a well-known perennial grass, the green form being a native of pastures and wet places in the British Islands. The variety *variegata* with silvery striped leaves is much used for edging flower beds and borders and grows freely. Being dwarf and densely tufted, it is admirably suited for edgings, and is readily increased by division into small pieces in September or October when the flower beds are being rearranged. The soil should be of a fairly rich and moist character, as dry poor soils give the foliage a dullish dirty appearance.

ELYMUS (Bunch Grass ; Lyme Grass).—A genus of tall perennial Grasses, the most ornamental of which for garden purposes is *E. arenarius.* It is a glaucous plant with stout creeping stolon-bearing rootstocks, by means of which it fixes the sands near the seashores and prevents them from being blown about by the wind. The stout smooth stems grow 3-6 ft. high, and the stiffish erect or recurving leaves have a graceful appearance, quite apart from the flower spikes, which appear in summer and stand well above the foliage.

Culture and Propagation.—Grown in good soil in parts of the rockery, in shrubberies, banks &c., it is very effective on account of its glaucous hue, and may be allowed to form good tufts. When necessary the plants may be increased by division in autumn or spring. Seeds may also be sown as soon as ripe in rich light sandy soil, and the seedlings pricked out or thinned out the following spring.

E. condensatus from British Columbia is a vigorous and ornamental Grass, quite hardy in most parts of the British Islands. It grows 6-8 ft. high, forming dense compact tufts, with long gracefully arching leaves, above which the stiff erect flower spikes are borne during the summer months.

Culture &c. as above. It may be grown like *E. arenarius* and increased by division or seeds.

Other species of Lyme Grass are *giganteus* from Siberia; *mollis* and *vir-*

ginicus from N. America, all more or less ornamental and requiring similar treatment.

ERIANTHUS Ravennæ.—A beautiful and picturesque Grass from Southern France, with tufts of leaves gracefully arching and recurving like those of the Pampas Grass, only smaller, and tinged with violet when young, and becoming greyish silky white when old. The flower stems reach a height of 4–6 ft. or more in good rich soil and warm sheltered situations, often tinged with violet when young, and bearing erect or gently nodding violet plumes, with silky hairy pedicels.

Culture and Propagation.—Unfortunately this fine Grass only attains luxuriant proportions in the mild southern parts of England and Ireland in warm situations. It may be grown in isolated tufts on the grass or lawn in the same way as the Pampas Grass, and when in flower has a grand effect. It may be increased by division best performed in spring. Seeds may also be sown in gentle heat in March and April, and grown on until the following year before transferring to the open ground.

FESTUCA (FESCUE GRASS).—A large genus of Grasses with roundish spikelets in racemes or panicles. Only a few are of any garden value. The most distinct is *F. glauca*, a variety of the Sheep's Fescue (*F. ovina*), a native of dry hilly pastures, woods &c. in parts of the British Islands. *F. glauca* has tufts of glaucous-blue bristle-like leaves, the lower ones often recurved, and stiff cylindrical stems 8–12 in. high, produced in great abundance, and ending in an erect narrow slightly branched spike. This plant is useful for edgings and parts of the rockery, and flourishes in ordinary soil, forming fine glaucous tufts. When used for edgings, the flowers are not so essential, and may be picked off as the spikes appear. The plants are easily increased by dividing the tufts in spring or autumn. Seeds are not freely produced. When obtainable they may be sown in early autumn or spring in a cold frame, and transferred to the open ground in autumn or spring, according to the time of sowing. *F. tenuifolia* is closely related to *glauca*, but has green leaves.

F. scoparia.—A pretty Pyrenean perennial with thick, bright green, short, stiff leaves, which make it useful for edgings to borders in dry poor soil. In rich soil the leaves and stems become longer, but are not then so commendable for edging purposes. The plants may be increased by dividing the tufts in spring or autumn.

GYNERIUM (PAMPAS GRASS).—*G. argenteum* is probably better known than any other Grass in cultivation. Like many other fine garden plants, it has been allowed to pass unmolested by the botanist for many years. Recently, however, the genus has been overhauled, and the Pampas Grass has been separated from the Gyneriums proper and made into a genus by itself, called *Cortaderia*. It is a native of temperate S. America (Paraguay &c.), and is remarkable for having diœcious flowers forming large wavy plumes. The arching leaves about 6 ft. long are glaucous-green, with rough edges. They form dense tufts 4–6. ft. high, and as much across. The flowers are borne in autumn in a large, dense, silky, feathery plume 1 ft. or more long at the end of an erect stalk 6–12 ft. high, and last for several months in a state of perfection, but they are often spoiled near London with dirty fogs and rain.

Several seedling varieties have arisen; hence a good deal of variation noticeable in the plants, some being dwarfer than others, while others have broader and longer leaves. The plumes also vary a good deal in fulness, the densest and longest being the most valuable. There is a very fine variety called *purpureum*, which has soft rosy-purple shining plumes, and there is also a form having the leaves striped with white.

Culture and Propagation. — Few plants can equal the Pampas Grass for fine effect on the lawn or for sub-tropical gardening. Its graceful habit and tall plumes waving in the breeze at once characterise it as a stately and valuable plant for ornamental purposes. It flourishes in light rich soils, and likes a good supply of water during the summer months. New plants are easily obtained by dividing the tufts in spring and replanting them in rich light soil, afterwards mulching them with well-decomposed manure, and giving a thorough soaking with water.

Seeds may also be sown in heat about February and March, and by the end of

May or beginning of June the young plants will be ready for the open ground. Very often they flower the first year during the autumn months. When sown in autumn as soon as ripe, it is safer to winter the seedlings in cold frames until the following spring.

The plumes of Pampas Grass last a long time in a dried state, and for this reason are in great demand for decorations, either in natural or artificial colours. Thousands of plumes are imported every year to supply the great demand for them.

G. Lambleyi variegatum is a distinct and beautiful Pampas Grass. It has been well grown by Mr. Gumbleton at Queenstown, Cork. He says it is perfectly hardy in that neighbourhood, and of comparatively dwarf habit, and also of rather slow growth and tardy development, not attaining its full size for many years. Its flower spikes are about 5 ft. high, with white feathery plumes of a most distinct appearance, and its leaves are prettily variegated with white.

Culture &c. as above for *G. argenteum*.

HOLCUS (SOFT GRASS).—The only plant of this genus useful for the garden is *H. lanatus albo-variegatus*, a beautiful form of a native perennial Grass with tufts of soft downy leaves having a broad central and narrow green stripes intervening with lines of clear silvery white. It grows in ordinary garden soil, and is useful for edgings. Increased by division of the tufts in autumn or spring.

HORDEUM.—The best known representative of this genus is Barley, but the only one of garden value is the Squirrel Tail Grass (*H. jubatum*), a native of North America. It grows about 2 ft. high, and in the summer months produces long gracefully arching spikes of flowers remarkable for the long and stiff bristly mane covering them, and forming the most attractive feature of the plant.

Culture and Propagation. — This species may be used with advantage to form borders in the wilder parts of the garden in windy places, as the waving of the flower spikes shows many shades of colour. Being an annual, *H. jubatum* must be raised from seeds sown every year, either in spring or autumn in the places where the plants are to bloom. The young spikes are useful for bouquets &c.

LAGURUS ovatus (*Hare's Tai Grass*).—A charming tufted annual Grass, native of sandy places in Guernsey, and the only one in the genus. It grows 6–10 in. high, with broad leaves and inflated downy or hairy sheaths. The flower spikes are borne in summer in dense hairy or woolly ovoid white heads over 1 in. long and ¾ in. broad, on stoutish downy stems, well above the foliage, and look very attractive. If cut before quite ripe they last a long time in a dried state, and are very useful for winter decorations, either in their natural colour, or dyed.

Culture and Propagation.—The plants grow in ordinary soil, and are useful for borders, the tufts being effective when in bloom. Seeds may be sown in spring in the open ground, or in autumn in pots, and wintered in a cold frame in the event of severe frosts.

LAMARCKIA.—This genus also contains only a single species—*L. aurea* (*Chrysurus cynosuroides*), a pretty low-stemmed annual Grass from S. Europe and N. Africa. It grows 6–9 in. high, and is remarkable for its silky drooping spikelets green at first, but afterwards assuming a shining golden colour, which is very attractive. It flourishes in light soil in the border, and may be raised from seeds sown in spring, or in autumn in pots for planting out in spring.

MELICA altissima. — A vigorous perennial Grass from the Caucasus and Siberia, growing about 8 ft. high, the stems being clothed with spreading, broadly lance-shaped linear leaves, and terminating in a long one-sided panicle of drooping spikelets in June and July. It is very ornamental and distinct when in bloom. If cut two or three weeks before fully ripe, the flower sprays last a good time, and are useful for bouquets &c.

Culture and Propagation. — This species likes a warm light soil, and may be increased by division in autumn or spring. Seeds may also be sown in early spring in pots, and planted out about September.

M. macra is a species from Monte Video. It is downy in all its parts, and tufted in habit, growing about 18 in. high, having stiffish needle-like leaves. Its flower spikes are also provided with stiffish awns. It is a rather tender plant and requires warm sheltered situations.

Culture &c. as above.

MISCANTHUS.—A genus containing about 8 species of tall-growing Grasses with narrow and often flattened leaves, which constitute the chief attraction from a garden point of view. Those in cultivation are much better known under the name of *Eulalia*, which has now been discontinued by botanists.

M. japonica (*Eulalia japonica*).—A graceful and ornamental Japanese Grass 6–7 ft. high, with elegant arching leaves, above which appear in summer and autumn plumes of velvety red flowers, each of which contains 4 glumes and 3 stamens. The variety *variegata* is a prettier plant, the leaves of which are striped with white and green lengthwise; and the variety called *zebrina* is remarkable for having the leaves transversely banded with white or pale yellow, although often the marking is very poor and indistinct.

Culture and Propagation.—These beautiful Grasses flourish in ordinary good garden soil, and when grown in bold masses are very effective on lawns and grass land generally. They are easily increased by division of the tufts in spring, but until plants become too large they should not be disturbed. Seeds may also be sown in spring in gentle heat in the same way as recommended for the Pampas Grass (*Gynerium*), see p. 960.

M. sinensis (*Eulalia gracillima*).—This is a pretty Chinese and Japanese Grass 3–5 ft. high, with gracefully recurved deep green leaves. The variety *univittata* is better known owing to the white band which runs down the centre of each leaf.

Culture &c. as for *M. japonica.*

PANICUM (Panick Grass).—An extensive genus of annual and perennial Grasses, only a few of which, however, are suitable for the hardy flower garden. These flourish in ordinary garden soil, and may be increased by seeds or division.

P. altissimum.—An elegant Grass, native of Central America, attaining a height of 3–6 ft. in cultivation, but much larger and tree-like proportions in a native state. The lance-shaped linear tapering leaves are over 1 ft. long, and finely toothed on the edges. The flowers are borne in large panicles composed of long verticillate branches, each of which is again branched and terminated by oval tapering spikelets of a deep red or maroon colour.

Culture and Propagation.—This species is best in warm parts of the country, and in rich light soil. It may be increased by division in spring and also by sowing seed in the open ground in April and May.

P. capillare.—A pretty annual, 1½–2 ft. high, native of the North temperate hemisphere, and perfectly hardy. It produces large pyramidal panicles of flowers well above the tufts of flat leaves which are scattered on the stems.

Culture and Propagation.—This species is increased by seeds sown in spring or autumn in the open ground.

P. virgatum.—An ornamental perennial Grass, 3–5 ft. high, native of N. America, producing large tufts of handsome linear leaves 1 ft. or more long, and more or less gracefully arching and recurved. The feathery panicles appear in summer, and are at first erect or ascending, but afterwards much spreading or drooping. This species may be grown in tufts on grass, and one of its great charms consists in the numerous flower stems it produces. These may be picked for decorative purposes with the foliage without detracting in the least from the beauty of the plant.

Culture and Propagation.—Plants may be increased by division in autumn or spring. Seeds may also be sown in the open air about April.

PENNISETUM.—A large genus of Grasses, some of which are of an ornamental character and suitable for the hardy flower garden.

P. latifolium (*Gymnothrix latifolia*). A very handsome tufted Grass 9–10 ft. high, native of Monte Video. Its stout cane-like stems are of a purplish-brown at the base, and clothed with broadly lance-shaped leaves, bright green, with a whitish band down the centre. The nodding flower spikes are not of a showy character, the chief beauty of the plant lying in its graceful Bamboo-like habit.

Culture and Propagation.—Except in such parts of the country as Devonshire, Cornwall, and the south of Ireland, this fine Grass is perhaps scarcely hardy enough to stand a British winter of any severity. The rootstocks may be lifted in autumn and stored away in cool places free from frost like Dahlias, and replanted in spring. Seeds may also be sown in heat in spring, the seedlings being planted out in June. If sown in autumn, the young plants require protection till spring.

P. longistylum.—An elegant Abyssinian perennial 12–18 in. high, with tufts of linear lance-shaped gracefully arching leaves, and slender stems ending in spikes 4–6 in. long, remarkable for their singular twisted appearance, and enveloped in a whitish feathery down. The variety *violaceum* is readily recognised by its purplish plumes, but the plant is otherwise similar to the white type.

Culture and Propagation. — This species grows freely in ordinary good soil and makes a handsome plant in the border or grouped in the grass. The plumes if cut before fully ripe last a long time in a dried state and are useful for decorative work. Although really a perennial this species is usually treated as an annual. Seeds are sown in a hotbed in March, and the young plants transferred to the open ground in June or the end of May. They are at their best from the end of July until the frost strikes them down In September the tufts may be lifted and potted, and wintered under glass until next planting season.

PHALARIS arundinacea (*Diagraphis arundinacea*).—A beautiful British perennial Grass 8–8 ft. high, inhabiting the sides of rivers, lakes, and marshy ground. It has creeping rootstocks, flat leaves, and elongated panicles of purplish spikelets. Grown by the sides of ponds and streams in masses, this species looks very handsome when its purplish spikes are swaying in the breeze. Increased by division. The variety *variegata*, known as 'Gardener's Garters' and 'Ribbon Grass,' has the green leaves striped with rosy-white when young, and yellow when old. It does not grow so tall as the green form, but requires similar moist or marshy positions. It will, however, flourish in moist parts of the flower border or shrubbery, but likes plenty of sunshine. In a cut state the leaves and flower stems are valuable for decorations. *P. canariensis* from S. Europe and N. Africa supplies the 'Canary Seed' so much used for singing birds.

POA (Meadow Grass).—Few species belonging to this large genus have any garden value. *P. palustris* (*P. fertilis*) is one of the best. It is a native of S. Europe, and forms dense tufts of long soft slender arching leaves, from which arise in the summer months light airy spreading panicles of a purple or violet colour, borne on slender stems 2–8 ft. high.

Culture and Propagation.—It is a good plant for the sides of streams or lakes, or in moist soil in the border, or on grass, and may be increased by seeds or division.

P. aquatica (or *Glyceria aquatica*) is a vigorous native Grass, inhabiting watery and marshy places. It has stout creeping rootstocks, and grows 2–6 ft. high, with flat somewhat erect leaves 1–2 ft. long, and much-branched panicles 6–12 in. long composed of oblong yellowish-green and purple spikelets.

Culture and Propagation. — It may be massed at the edges of pieces of water, streams, lakes &c. and increased by division in autumn or spring.

P. trivialis albo-vittata.—A beautiful dwarf form of a very common native perennial Grass. It grows about 6 in. high, forming dense tufts of erect flattish green leaves broadly edged with pure white.

Culture &c. as above. It is useful for edging beds and borders, and may be increased by division in autumn or spring.

STIPA (Feather Grass). — This genus contains nearly 100 species, but the most popular is *S. pennata*, a native of S. Europe. It grows in strong tufts like ordinary grass, but in early summer the gracefully arching flower stems about 2 ft. high appear and give it a wonderful striking appearance, caused by the long feathery bristles, twisted beyond half their length, which issue from each silky grain enclosed by the scales or glumes. These bristly barbs float about the air when detached, carrying the attached seeds at the base forming a kind of anchor.

Culture and Propagation.—Grown in large tufts in the border or on grass land, the Feather Grass is a very attractive and curious plant. It flourishes in light sandy loam, and may be increased by division or seeds. The division of the tufts should be done carefully in autumn or spring.

ZEA Mays (*Indian Corn*). — A well-known ornamental Grass probably of American origin. It grows 3–4 ft. high, having thick knotted stems, clothed with broad strap-shaped gracefully arched and wavy leaves stem-clasping at the base. The spikelets of flowers are monœcious, that is, some contain only stamens, others only pistils. The males or staminate flowers are borne in a panicle at the ends of the stems, while the female or pistillate spikelets issue from the axils of the leaves lower down the stem, having long feathery tassels. It is from these the well-known cylindrical spikes or cones ('cobs') of fruit are produced with their many-coloured seeds. The variegated form is a much finer and more attractive plant from a garden point of view than the green form.

Culture and Propagation.—Ordinary good garden soil suits the variety *variegata*, which is rather more tender than the green form. The seedlings from it at first produce green leaves, but very soon begin to develop the striping. It comes true from seeds sown in gentle heat about March and April, the young plants being hardened off and got ready for planting out in June or the end of May. The foliage is beautifully striped with creamy or yellowish white, and renders this plant a very striking and graceful object in the garden during the summer and autumn months.

HARDY BAMBOOS.—Under this heading are described the various genera and species which experience has now proved to be practically hardy in the British Islands. There are now about 50 distinct species of Hardy Bamboo in cultivation, and most of them come from China and Japan; only three hardy species come from the Himalayas, namely *Arundinaria aristata*, *A. racemosa*, and *A. spathiflora*, and one from the United States—*A. macrosperma*.

Bamboos, which may be regarded as woody-stemmed Grasses, have a grace and elegance all their own, and wherever a sheltered nook or dell can be found in a garden, there should some at least of them find a home. The ugliest Bamboo is graceful, so that it would be superfluous to tack complimentary but well-deserved adjectives to every species described. Some are tall and some are dwarf, but there are intermediate forms, and some grow more freely and display their foliage better than others, so that although the general hue is a green one, there is an endless variety and charm in it that always excites admiration.

The best situation for Bamboos is one sheltered from northerly and easterly winds, and if the shelter is given by trees or shrubs or hedges, so much the better, as the surroundings will then be more in harmony with nature.

Culture and Propagation.— Bamboos flourish in a good rich loam. The beds in which they are to be planted should be thoroughly dug or trenched. The best time for planting is at the end of May or early in June, according to the weather. After planting, which must be done carefully, so as not to break the brittle roots, the soil may be well mulched with cow-manure, and a mass of dried leaves or litter may be placed round each plant to prevent evaporation from the soil during the summer months. A good soaking is essential after planting, and during the hot weather the plants may be given abundance of water when established.

When plants are imported from the Continent or Japan or other parts of the world, they should travel during the autumn and winter—the period when the plants are practically at rest, and least likely to suffer from a change. Mr. Freeman-Mitford, who has had great experience in the importation and cultivation of Hardy Bamboos, and who has probably done more than anyone else to make them the popular plants they now are, advises that imported plants should be treated as follows:—When a consignment of Bamboos arrives, soak the roots well for 12 hours. Then pot them, taking great care not to disturb the roots. Afterwards place in a cool house for the winter. Very little water is given to the roots, but the leaves should be constantly syringed. In spite of this, many species lose their leaves, but early in February the axillary buds begin to swell, and by the end of March the plants are in full leaf again. The plants are then watered freely, and root action soon begins. New shoots are seen to pierce the soil. Not a plant has been lost by this treatment. By the middle of May the plants are hardened off in the same way as Pelargoniums and other bedding plants, preparatory to being planted outside at the end of May or June. In taking the plants out of the pots great care must be taken not to tamper with the roots. They are as brittle as glass, and any interference with them is in the highest degree dangerous. The roots, however pot-bound they may appear, will soon find their way about in the new soil. Should any have come through the hole at the bottom of the pot, it is better to break the pot than attempt to pull the roots through.

If possible the newly planted Bamboos should be watered and syringed in dry weather, but the rains of heaven are what they like best. It is a good plan to surround the new beds with wire netting as a protection against rabbits and pheasants (which do harm by scratching round the roots in the newly turned up soil), and for keeping in the dead leaves. In a year or two, when the plants shall have been thoroughly established, the wire netting may be removed, and the Bamboos left to take care of themselves.

How well they do this may be seen at Kew, where there is a fine collection planted only a few years ago. One of the great charms about Hardy Bamboos is that they are just in all their glorious beauty in autumn, when other plants are losing their leaves, and flowers are withering, and throughout the dull winter months they are bright spots in the garden, giving a luxuriant tropical aspect to apparently desolate surroundings.

Propagation.— Hardy Bamboos may be increased by carefully dividing the tufts about April and May, never in autumn, as the injured roots cannot be replaced to stand the winter. Two or three stems or culms should be left to each rootstock, and a ball of earth round the latter will also be an advantage. The divided portions should be planted carefully as above recommended, and afterwards receive a good mulching of cow manure, and a protective layer of leaves, as well as a good watering and syringing.

Cuttings.—Bamboos may also be increased by detaching a portion of the rhizome with a stem attached. The stem is cut down to about 1 ft. long, and with the rhizome is planted in rich soil so that the lower joints are well covered. If planted in pots and placed in moist bottom heat, new shoots will appear more quickly. The lower knotty portions of the stem without the rhizome will also make plants if plunged in moist heat when potted. The rhizomes themselves may be cut into lengths of 6–8 in., and planted 4–6 in. deep in good loamy soil out of doors, receiving plenty of water during the summer. Only rhizomes of the previous year should be selected for this purpose, as they contain eyes or buds, which the older rhizomes do not. All cuttings are best inserted in spring.

Seeds. — When obtainable, Bamboo seeds may be sown very thinly in March and April, in rich and thoroughly well-drained sandy loam. About a quarter of an inch of fine soil is sufficient to cover the seeds. The pans or pots in which they are sown should be plunged in a hot-bed, and care should be taken to keep the atmosphere close and moist until the seedlings are well above the soil. A little shade is at first necessary to protect the seedlings from hot sun, but as they increase in size and vigour more light and air may be gradually given; and by the end of June the young plants should be given as much air and sunshine as possible, with plenty of water. It is best to allow the plants to grow in the seed pans until the following spring, when they may be pricked out separately into small pots and placed in heat and shade until established. They may then be hardened off again and grown on plunged out of doors until spring. During the winter months they are safer under glass, where they may remain until the end of May or beginning of June. They may then be planted out into their permanent positions, being mulched, syringed, and watered as before described, and allowed to take care of themselves.

Unfortunately Bamboos have become terribly confused in the naming, and the same species have been referred at different times to different genera. The names given here are those adopted by Mr. Freeman-Mitford.

ARUNDINARIA.—Over twenty hardy species are now included in this genus. They are characterised by a graceful tufted habit, with branches in semiverticillate clusters, and narrow grassy leaves. Although many species produce flowers, they are of no particular beauty. It is well, however, to be on the watch for those that ripen seeds, as plants raised from home-saved seed are more likely to stand our changeable climate than those from imported clumps or seeds.

A. anceps.—A beautiful Bamboo, probably of Chinese origin. The stems are brown when mature, the leaf sheaths are hairy, and the leaf-stalk yellow.

Culture &c. as above, p. 964.

A. aristata.—A pretty species from the north-eastern Himalayas, where it grows at an elevation of 11,000 ft. It grows 6–10 ft. high, and has purplish stems and tessellated foliage.

Culture &c. as above, p. 964.

A. auricoma (*A. Fortunei aurea*).—A distinct Japanese Bamboo 3–4 ft. high, having round purple-green stems and leaves 5–7 in. long and 1 in. or more broad, beautifully striped with golden-yellow, and furnished with hairs on top of the purple-green sheaths. *A. Maximowiczi* is very near if not identical with this.

Culture &c. as above, p. 964.

A. chrysantha (*Bambusa chrysantha*). A beautiful Japanese Bamboo 3–4 ft. or more high, with numerous branches at each joint and leaves about 7 in. long, over 1 in. wide, alternately striped with green and yellow. The under surface is distinctly glaucous on one side of the midrib but not the other.

Culture &c. as above, p. 964.

A. falcata (*Bambusa falcata*).—This fine Bamboo is found on the Himalayas at an elevation of 8000–10,000 ft. It is cut down to the ground in winter, but in spring pushes up stoutish yellow-green stems 7–10 ft. high, with purplish joints. The branches are in dense whorls having bright green leaves, rather glaucous underneath, with hairy sheaths.

A plant known as *Bambusa gracilis* seems to be a form of *A. falcata*, but differs from it chiefly in having smooth instead of hairy leaf-sheaths.

Culture &c. as above, p. 964.

A. Falconeri (*Thamnocalamus Falconeri*).—This is sometimes called *A. falcata*, but is a quite different plant, and recognisable by its smaller leaves and more slender stems. It is a native of the Himalayas at an elevation of 8000 ft. Its stems are usually killed down to the ground in winter, but new ones 7–8 ft. high shoot up every spring. They are rather slender, having the branches arranged alternately and distichously in half-whorls at each joint. The smooth light green leaves are about 6 in. long. In the south of England and Ireland it attains a greater height and a more luxuriant aspect. At Fota Island, Cork, this species throws up numerous canes 20–25 ft. high every year, and would grow quite as well doubtless in Cornwall.

Culture &c. as above, p. 964.

A. Fortunei.—This was formerly known as *Fortunei variegata.* It has dense tufts of stems 2–4 ft. high, branched or unbranched close to the ground. The leaves are about 6 in. long, and less than 1 in. wide, the surface being longitudinally striped with white, while the under surface is downy, and the margins and leaf-sheaths are hairy. There is a form of this called *compacta*, which is often grown in pots, and is only 3–6 in. high, but, planted out, attains a greater height. *A. Fortunei variegata*, unlike the green form, loses its leaves during the winter, but is perfectly hardy. The variety known as *Fortunei aurea* is a stronger-growing plant than *variegata*, and has broader leaves striped with golden-yellow instead of white. All the forms are natives of Japan, and are beautiful garden plants.

Culture &c. as above, p. 964.

A. Hindsi (*Bambusa erecta*).—A beautiful Japanese plant 6–12 ft. high, readily recognised by the almost erect direction of the branches issuing from the joints on the main stems, which are of a very dark olive-green, covered with a waxy bloom when young. The green linear leaves, slightly glaucous underneath, are about 8 inches long and ½ in. wide, with a few hairs on the edges and on top of the leaf-sheaths, while the veins are beautifully and conspicuously tessellated. The variety *graminea* (known also as *Bambusa graminea*) is a more slender plant and not quite so vigorous a grower. It has yellowish stems and narrower but longer grassy leaves, the veins of which are not so conspicuously tessellated.

Culture &c. as above, p. 964.

A. humilis.—This name has now been given to a plant formerly known as the green-leaved form of *A. Fortunei.* It is a Japanese plant, and grows 2–3 ft. high, the round green stems having reddish sheaths, hairy at the ends and sides, and ending in bright evergreen leaves over 4 in. long and about ¾ in. broad, tapering to a point. The rootstock creeps vigorously and soon spreads the plant over the ground.

Culture &c. as above, p. 964.

A. japonica (*Bambusa Métaké*).—This is the best known of all the Hardy Bamboos. It is a native of Japan, and grows 10–15 ft. high according to locality. As its rootstocks spread a good deal it should be grown by itself in clumps, so as not to become entangled with other species. It is readily recognised by its leaves, which are 8–12 in. or more long and 1½–2 in. wide. The upper surface is of a smooth and shining green, the under surface being rather glaucous and wrinkled, while the brown persistent leaf-sheaths almost cover the stems.

Culture &c. as above, p. 964.

A. Laydekeri (*Bambusa Laydekeri*). A dwarf-growing Japanese species, having thin stems and narrow leaves, the latter mottled with yellow, and narrowing rather abruptly into a stalk at the base. One edge of the leaf is well furnished with hairs, whilst the other has scarcely any.

Culture &c. as above, p. 964.

A. macrosperma (*Bambusa Hermanni; B. Neumanni*).—A very variable Bamboo, native of the United States, where it grows in dense masses on the muddy banks of rivers. It has slender stems 2–10 ft. or more high, about as thick as quills, and almost covered with the persistent hairy leaf-sheaths. The leaves are 7–8 in. long and about 1½ in. wide, smooth above, downy beneath, and fringed with hairs on the edges. There is a form called *tecta*, dwarfer and denser in growth than the type.

Culture &c. as above, p. 964.

A. Nagashima. — A dwarf Japanese species about 3 ft. high, with round purple-green stems, and sharply serrated leaves 6–7 in. long, furnished with hairy sheaths.

Culture &c. as above, p. 964.

A. nitida. — A lovely quick-growing Bamboo from Central China, recognised by its blackish-purple stems, scarcely thicker than a goosequill and 6–12 ft. high. The branches are in dense clusters at the joints, bearing small lancet-shaped bright green leaves 3–4 in. long and distinctly tessellated. It is very hardy and graceful, and remains beautifully green throughout the winter. It has been erroneously called *A. khasiana*—a different species from the Himalayas. *A. nitida* is best in shaded places, as the leaves rapidly curl up in hot sunshine.

Culture &c. as above, p. 964.

A. nobilis.—A handsome and vigorous Bamboo, probably of Chinese origin. In Cornwall it grows 24 ft. high, having yellowish stems with dark purple joints, the lower rim of which is marked with grey. It is perfectly hardy, but drops the old leaves in early summer with the appearance of the new ones.

Culture &c. as above, p. 964.

A. palmata (*Bambusa palmata*).—A strikingly handsome Japanese Bamboo 4–10 ft. high, and perhaps more in the mild southern parts of England and Ireland. Its creeping rhizomes are very active, and the plants should therefore be grown in isolated clumps away from other species. The stems are very slender, with a few erect branches; but the chief distinguishing feature of the plant lies in the beautiful vivid green leaves, which are over 1 ft. long and 3 in. wide, tapering rather abruptly to a sharp point, the edges being slightly serrated, and the principal veins almost riblike.

Culture &c. as above, p. 964.

A. pumila (*Bambusa pumila*). — A beautiful dwarf Bamboo from Japan, somewhat in the way of *A. humilis*—otherwise the green-leaved *A. Fortunei*, but a much more slender-growing plant in every way. It has very slender stems, about as thick as an ordinary knitting-needle, sometimes branched at the base. The leaves are over 4 in. long and about ¾ in. wide, and are slightly serrated on the edges.

Culture &c. as above, p. 964.

A. pygmæa (*Bambusa pygmæa*).—This handsome little Japanese species has been appropriately called the Pigmy Bamboo on account of its stature. It is the dwarfest species known, and usually reaches a height of only 3 or 4 inches. It grows in dense compact masses and spreads rapidly over the ground by means of its underground creeping rhizomes. The leaves are 3–4 in. long and about half an inch wide, bright green above, downy and glaucous beneath. They retain their beautiful freshness throughout the winter months. When grown as a carpet or bordering the plant is very ornamental. Its growth is so dense and rapid that weeds have no chance to develop. It increases with the greatest freedom by division just after growth begins in spring.

Culture &c. as above, p. 964.

A. racemosa.—A low-growing Bamboo, native of the north-eastern Himalayas, where it is found at an elevation of about 12,000 ft. and attains a height of 15 ft. or thereabouts. It has smooth round stems with joints about 2 in. apart, furnished with bright green leaves 2–4 in. long, with distinctly tessellated venation. It seems to be quite hardy, and retains its foliage during severe winters.

Culture &c. as above, p. 964.

A. Simoni (*Bambusa Simoni*). — A splendid strong-growing Chinese Bamboo 20–25 ft. high, the stems being 1 in. or more in diameter at the base. The branches are borne in dense alternate clusters at the joints, and are luxuriantly furnished with graceful slight hairy leaves about 1 ft. long and 1 in. or more wide, tapering to a fine point. Like *A. chrysantha*, the under surface of the leaf is glaucous on one side of the prominent midrib but not on the other, and 5 or 6 veins are conspicuous on each side of the midrib. The rhizomes of this species spread a great distance—often 4 ft. or more from the main stock. It is therefore best to isolate the plants in positions where they may spread and increase at will, otherwise, if grown with other species, a sharp lookout must be kept for distant suckers.

There is a variety called *albo-striata* in which the leaves, or a large number of them, are striped with white, but they are much shorter and narrower than the green ones.

Culture &c. as above, p. 964.

A. spathiflora (*Thamnocalamus spathiflorus*).—A beautiful Hardy Bamboo from the Himalayas, at an elevation of about 9000 ft., remarkable for its graceful tessellated foliage.

Culture &c. as above, p. 964.

A. Veitchi (*A. kurilensis paniculata; Bambusa a bo-marginata; B. Veitchi*). A native of Japan and the Sachalin Islands, very much resembling *A. palmata* in habit, but not in height, as the stems are only about 1–2 ft. long. They are clothed with narrow oblong leaves about 7 in. long and 2½ in. broad, of a deep green above, glaucous below and much ribbed. In winter the edges turn yellow and then brown, 'giving the plant a variegated but shabby appearance,' as Mr. Freeman-Mitford says. In spring the plants are very beautiful when putting on their mantle of fresh green foliage. The rhizomes spread with great freedom, and the ground is soon carpeted with growths from them. *A. metallica* closely resembles this species, but the leaf edges do not wither in winter.

Culture &c. as above, p. 964.

BAMBUSA (Bamboo). — Although most of the Hardy Bamboos now described under Arundinaria and Phyllostachys have been referred to this genus, only a few species are now regarded as properly belonging to it. As they require the same cultural treatment as detailed above at p. 964, it is unnecessary to repeat the information here.

B. angustifolia (*B. Vilmorini*). — A charming little Japanese Bamboo 9–12 in. high, with round and very slender stems, which are tinged with purple when young. The serrated leaves are about 4½ in. long and ⅜ in. wide, more or less heavily striped with silvery white. Owing to its dwarf habit this species may be utilised for bordering the Bamboo garden.

Culture &c. as above, p. 964.

B. disticha (*B. nana, Hort.*).—A distinct and pretty Japanese Bamboo 2–3 ft. high, forming dense tufts of stems which branch close to the ground, and are clothed with 2 rows of leaves each about 2½ in. long and about ⅜ in. wide, furnished with hairs on the margins and on top of the sheath. It is quite hardy.

Culture &c. as above, p. 964.

B. marmorea.—A very distinct and handsome Japanese species readily recognised by the peculiar appearance of the young stems which are covered with purple sheaths, delicately blotched or marbled with a silver-grey pink. These sheaths are so close together that they almost obscure the stems, which are of a bright emerald green or dark purple according to age. The bright green serrate leaves are about 4½ in. long and 3–5 eighths of an inch broad, distinctly contracted about half an inch from the very sharp point. The rhizomes spread rapidly and send up suckers some distance from the main tuft.

Culture &c. as above, p. 964.

B. quadrangularis.—A Chinese Bamboo remarkable for having stems which are square instead of round. The squareness becomes more apparent as the stems grow old, each side being over ½ in. wide, and the joints about 6 in. apart. Unfortunately this curious species is not nearly as hardy as most of the others and requires protection under glass in winter. In parts of Cornwall, Devonshire, and the south of Ireland, however, it would probably prove perfectly hardy in warm sheltered spots.

Culture &c. as above, p. 964.

B. tessellata (*B. Ragamowski*). — A distinct and beautiful Bamboo, native of China and Japan. Although its roundish purple-green stems, mostly hidden by withered leaf-sheaths, grow only 2–2½ ft. high, they are remarkable for bearing larger leaves than any other species of Hardy Bamboo. The leaves often measure 18 inches long and 8 inches wide, and have a downy line on one side of the midrib beneath. The rhizomes creep to great distances, sending up suckers, thus carpeting the ground in a short time. This species is very hardy, and has been in cultivation at least fifty or sixty years.

Culture &c. as above, p. 964.

PHYLLOSTACHYS. — There are almost as many hardy species now placed in this genus as in Arundinaria, but the majority of them are still known in gardens under the generic name of Bambusa.

One of the peculiarities by which most of the species of *Phyllostachys* may be readily distinguished from the *Arundinarias* and *Bambusas* is that the stems are alternately flattened and rounded on one side between the joints.

P. aurea (*Bambusa aurea*).—A graceful Japanese species 10–15 ft. high, chiefly distinguishable by its yellow or greenish-yellow stems, ½–1 in. in diameter. The leaves are 4–7 in. long and about 1 in. broad, pointed and very minutely toothed or serrated on one edge only, bright green above, rather glaucous beneath, with a ring of brownish hairs on top of the leaf-stalk. The plant known as *Bambusa sterilis* is now regarded as a form of this species. It is one of the hardiest of Bamboos, and is remarkable for the intense glaucous hue on the under surface of the leaves.

Culture &c. as above, p. 964.

P. Castillonis (*Bambusa Castillonis*). This Japanese Bamboo is one of the finest and at the same time also one of the hardiest in cultivation, having stood as much as 24° of frost without injury. The stems are very attractive, being of a much brighter yellow colour than those of *P. aurea*, and handsomely striped with deep green in the broad channel that extends from one joint to another. The leaves, which are serrated on both edges, are 7–9 in. long and 1½–2 in. wide, and when first they appear are striped with bright orange-yellow fading to creamy-white with age. The sheaths of the branchlets being of a pleasing pinkish tint, the colour and striping of the plant are very striking and distinct in appearance, and it should find a place in every garden.

Culture &c. as above, p. 964.

P. fastuosa (*Bambusa fastuosa*).—This tall stately Japanese species is almost unrivalled for the grace and beauty of its spreading branches and luxuriant foliage. The leaves are 5–7 in. long, and nearly 1 in. broad, tapering to a sharp point, and somewhat abruptly constricted about an inch from the end, thus giving the leaves the peculiar appearance of having a tongue at the end. They are of a bright pleasing green on the upper surface, but very glaucous beneath, and when ruffled by the wind the two shades of colour are in striking and effective contrast. This is an excellent Bamboo for wild and picturesque parts of the garden.

Culture &c. as above, p. 964.

P. flexuosa (*Bambusa flexuosa, Hort.*) A beautiful species 6–12 ft. or more high, native of N. China. It is distinguished by its flexuous stems which in a young state are often tinted with purple. In habit and foliage it resembles *P. viridi-glaucescens*, and may ultimately prove to be only a form of that species.

Culture &c. as above, p. 964.

P. fulva. — A recently introduced species from Japan, perfectly hardy so far as present experience goes, and promising to be a valuable decorative plant when fully established.

Culture &c. as above, p. 964.

P. Henonis (*Bambusa Henonis*).— A charming and graceful Japanese Bamboo, with slender stems 4–6 ft. or more high, which with the light green foliage sway gently with the slightest breath of air. The slightly zigzagged stems are green at first but assume a yellowish hue as they grow older. The leaves are 2–3 in. long and about ½ in. broad, tapering to a sharp point, light green above, rather glaucous beneath.

Culture &c. as above, p. 964.

P. heterocycla (*Bambusa heterocycla*). This beautiful Japanese species is known as the 'Tortoise Shell Bamboo' owing to 'the curious arrangement of the alternately and partially suppressed internodes at the base of the stem, which sheath it in plate armour like the scales of a tortoise.' The stems at the base are 2 in. in diameter, and the leaves are about 4 in. long and ⅜ in. wide, bright green above, and slightly glaucous beneath, with one edge only minutely toothed.

Culture &c. as above, p. 964.

P. Marliacea (*Bambusa Marliacea*). A rare and handsome Japanese species which will probably grow a dozen or more feet high in cultivation. The dark shining green leaves are very handsome when the withered leaf sheaths fall or are removed, and are noticeable for having the joints very close to each other near the base, about 1–2 in. apart. The long branches arch gracefully and are clothed with bright green leaves.

Culture &c. as above, p. 964.

P. mitis (*Bambusa mitis*).—This Chinese species is said to be the tallest of all Hardy Bamboos, and will probably reach a height of 20–30 ft. in the most favoured parts of the British Islands. In China and Japan the stems grow 60 ft. high, and are gracefully arched when fully developed. In this country they grow quickly in spring, often as much as 4–6 inches in 24 hours and are 1½–3 inches in diameter at the base. The Japanese eat the young fleshy shoots, served with a pungent sauce.

Culture &c. as above, p. 964.

P. nigra (*Bambusa nigra*).—This tall and graceful Bamboo, native of China and Japan, has been grown for many years past in the Temperate House at Kew, where it has attained a height of over 25 ft. It has also proved hardy in the open air at Kew, and may eventually reach the same dimensions as the indoor specimens. The more or less zigzagged stems are of deep olive-green colour the first season, but they change to a shining black or blackish-green the following year, and constitute one of the most striking features of the plant. The small thin leaves are borne in luxuriant masses, and are 3–4½ in. long by ¾ in. broad, bright green above and glaucous beneath.

Culture &c. as above, p. 964.

P. nigro-punctata (*Bambusa nigro-punctata*).—Until recently this plant was regarded as a variety of *P. nigra*, but now it has been elevated to specific rank. It resembles *P. nigra* proper in habit and appearance but is readily distinguished from it by means of the stems, which, instead of being a uniform black or greenish-black, are distinctly mottled with paler green. *P. boryana*, now also regarded as a species, differs from the above in having green instead of black stems.

Culture &c. as above, p. 964.

P. Quilioi (*Bambusa Quilioi; B. Mazeli*).—A distinct species from Northern Japan, closely related to *P. aurea* and *P. mitis*. The stems, which are grooved between the joints from one set of branches to another, attain a height of 15–20 ft. in cultivation when well established in favourable localities, and are 3–4 in. in circumference at the base. It has a more tufted habit than *P. aurea* and the leaf characters are similar, but the stems are much greener. Very hardy.

Culture &c. as above, p. 964.

P. ruscifolia (*P. Kumasaça; Bambusa ruscifolia; B. viminalis*). — A beautiful and distinct Japanese species rarely exceeding 1 ft. or 18 in. high. The stems, which are dark green at first but change to brown when ripe, form one of the distinguishing features of the plant by their peculiar zigzag growth. The leaves differ also from those of other Bamboos in being narrowly ovate like those of some species of Ruscus, and about 3½ in. long and more than 1 in. wide at the base, with slightly serrated margins. They are smooth above, but somewhat downy beneath.

Culture &c. as above, p. 964.

P. sulphurea (*Bambusa sulphurea*). A beautiful Japanese species not yet well known, but easily recognised by the beautiful golden-yellow colour of its stems and branches when young. Plants in cultivation have produced stems over 18 ft. high, with a circumference of nearly 8 in. at the base. In appearance it very much resembles *P. mitis*.

Culture &c. as above, p. 964.

P. violescens (*Bambusa violescens*). A handsome Japanese Bamboo closely related to *P. viridi-glaucescens*. When fully developed it will probably attain a height of 12–15 ft. or more, the young stems being bronzy-green, sometimes tinted with purple in warm parts of the country, but changing to pale green when approaching maturity. The leaves are 5 in. long and over 1 in. wide, bright green above, very glaucous beneath, and minutely serrated on one edge only. The branches are mostly in twos from each node, but occasionally in threes.

Culture &c. as above, p. 964.

P. viridi-glaucescens (*Bambusa viridi-glaucescens*).—This is one of the most elegant and graceful of all Hardy Bamboos and should be one of the first planted in every collection. The erect or arching stems grow 12–20 ft. high, and are nearly 8 inches in circumference at the base. They are of a very deep shining olive-green, much zigzagged, and traversed with two channels between the joints, from one cluster of branches to the next. The leaves are 8–4 in. long and about ¾ in. across, serrated on one edge, and having a ring of hairs round the top of the sheath. The foliage retains its freshness and grace during the winter, and makes this species one of the most attractive plants. The rhizomes run to a great distance, sending up suckers in a very oblique direction at first, thus spreading the plant over a very large area.

Culture &c. as above, p. 964.

CXXVIII. CYPERACEÆ—Sedge Order

A large order of tufted grass-like plants with solid, usually jointed, and frequently angular stems, and unsplit leaf sheaths. The flowers are hermaphrodite or one-sexed, arranged in panicles or racemes, the individual flowers being enclosed in imbricated chaffy or leathery bracts called glumes.

Although, according to various authors, 2000–3000 species belong to this order, there are only a few of any garden value, and as they are all more or less closely related, they may be mentioned here in alphabetical order.

CAREX paniculata (*Sedge*). — A large British and European Sedge with densely matted rootstocks forming tussocks 2–4 ft. in diameter, and sending up stout leafy 8-sided stems 1–4 ft. high, and long narrow flat leaves. The large panicles of pale brown flowers appear in June and July.

Culture and Propagation. — This species is found in wet copses and marshes, and similar spots in the garden will suit it. It may be increased by division in autumn or spring.

C. pendula is another native of the British Islands, being found in damp woods, bogs &c. It grows 8–6 ft. high with smooth or roughish 8-angled stems, and broad flat pale green leaves. In May and June the beauty of the plants is enhanced by the long slender drooping spikelets of flowers.

Culture &c. as above.

There are 500–800 species of Carex, of which 60 are natives of the British Islands, but most of them are quite uninteresting from a garden point of view.

CYPERUS longus (*Galingale*). — A rare English marsh plant with a stout creeping rootstock, and 8-angled stems 2–8 ft. high. In August and September the reddish-brown flower spikes are borne in umbel-like cymes, from the base of which arise a few flat keeled and gracefully recurving leaves 1–2 ft. long.

Culture and Propagation.—This may be grown at the borders of lakes, streams &c., and increased by division.

SCIRPUS lacustris (*Bulrush*).—An ornamental native plant with thick round and usually leafless stems 1–8 ft. high, springing from creeping rootstocks, and bearing at the summit cymes of flowers in July and August. The blooms are arranged in sessile cone-like spikelets, which look very pretty when in fruit, being reddish-brown in colour.

Culture and Propagation.—This plant should be planted in water about 1 ft. deep, and large masses of it look effective in autumn. Increased by division in autumn or spring.

S. Tabernæmontani zebrinus, better known as *Juncus zebrinus*, has long round leaves barred and banded with yellow and green alternately, and is a handsome and attractive plant grown in masses by the edge of water, the stems reminding one very much of porcupine quills.

Culture &c. as above.

Class II. *GYMNOSPERMS* (see p. 122).

CXXIX. GNETACEÆ

A small but interesting order containing shrubs or trees with jointed branchlets and simple opposite sometimes scaly leaves. Flowers one-sexed, the male and female ones often on different plants (diœcious) and arising, either singly or in dense conical or interrupted spikes, from the axils of the opposite and decussate bracts. There are only three genera and about forty species belonging to this order, mostly natives of the tropics.

EPHEDRA.—A genus of erect or trailing evergreen shrubs with articulated joints and rudimentary or scale-like leaves resembling those of the Horsetail. Flowers usually diœcious.

E. distachya.—A curious evergreen shrub or bush 3–4 ft. high, native of South Europe, with green cylindrical branches, furnished at each jointed node with two small linear leaves. The whitish flowers are borne in twin catkins or spikes in July and August, and are succeeded by red or scarlet berries on the female plants. The variety *monostachya* (or *E. vulgaris*) is a smaller and hardier shrub 1–2 ft. high, which produces its flowers in solitary instead of twin catkins.

Culture and Propagation.—These curious plants, although rather attractive in appearance, and especially when bearing their red berries in autumn, are not very much grown except in botanical collections. They flourish in ordinary soil in warm and sheltered spots, and may be used in nooks in the rock garden. They are increased by layering the branches in summer and autumn.

CXXX. CONIFERÆ—Pine Tree Order

An important order, consisting for the most part of evergreen trees or shrubs, having the leaves alternate, opposite, or clustered in a membranous sheath, often narrow, linear, and needle-like, or reduced to dense imbricating scales, rarely with a flattened limb. Male and female flowers without a perianth, and separate, either on the same (monœcious) or on different (diœcious) trees. Male flowers in catkins; stamens numerous. Female flowers in cones or solitary, each flower consisting of two scales, the upper one having the naked ovules on the inner surface, the lower one being merely a protecting bract. Seeds often winged, not enclosed in an ovary, as is the case with all the other plants hitherto described in this work. They simply lie naked on the surface of the scale; hence the plants belonging to this group have been called naked-seeded plants or Gymnosperms. And as a rule when the seed germinates there are apparently more than two seed-leaves or cotyledons. A feature of the wood of the plants in this group is that it has no rays (called medullary rays) radiating from the centre to the circumference, as may be seen in the woods of plants previously described. The flowers also, instead of being fertilised by bees and other insects, have this important office performed by the wind. When the stamens or male flowers are ripe, the pollen may be seen blown about in dense golden clouds.

The cone-bearing trees and shrubs are natives, for the most part, of temperate and mountainous regions. There are about 300 species altogether, and of these about one-half are in cultivation, those indigenous to the British Islands being the Scots Fir (*Pinus sylvestris*), the Juniper (*Juniperus communis*), and the Yew Tree (*Taxus baccata*).

There are few families of plants at once so useful and so ornamental as the Conifers. This work is chiefly concerned with their value as decorative plants, and the most ornamental kinds will be found described below. The charge is often made against Conifers that they are much too sombre to give a cheerful aspect to the landscape. Doubtless this is true where they have been planted injudiciously to the exclusion of other ornamental and brighter-foliaged trees. But where they have been planted with taste and judgment so as to harmonise or contrast with the surrounding vegetation, their effect is at once handsome and picturesque. Owing to their size and habit, Conifers are mostly suited for the embellishment of large gardens, pleasure-grounds, and parks. Some, like the Deodar, the Cedar of Lebanon, and the Atlas Cedar, are beautiful lawn-trees, as are also many of the Abies and Piceas; others make fine groups or avenues, and some lend a charm to large rock gardens; while others, again, make charming hedges. As a general rule, Conifers are unsuitable for what may be termed shrubberies, although a Pine here and there in such places often has a grand effect. To see them to perfection they must have plenty of space to develop their elegant and usually symmetrical forms, and this cannot be done where they are surrounded and choked with undershrubs.

It must not be thought that the Conifer family are all of a sombre green colour. Although green is the prevailing tint, there are so many shades of it—some light, some dark, some fresh, some sombre, some covered with a beautiful Plum-like bloom—that there is a vast and pleasing variety. The cones, too, of many of the species are wonderfully beautiful, and a collection of them is very interesting. The bracts of some open readily when ripe, but others require roasting before they will separate.

Soil and Situation.—The soil most suitable for the great majority of Conifers is a light or fairly heavy, deep, rich loam on a gravelly subsoil. Stagnant water and damp, low-lying spots are injurious and often fatal. The plants in such places never thrive, and cannot make or ripen their growths sufficiently well to withstand the rigours of a severe winter. Many of the Japanese, Mexican, and Californian Conifers require to be sheltered from the bleak winds of the north and east. Screens of other hardy trees or shrubs should protect the more tender—which are usually the most beautiful—Conifers on these two sides, especially if the land happens to be flat and unprotected by any natural risings or undulations.

Planting.—Upon the proper planting of Conifers, as with most other trees, a good deal of ultimate success depends. Only Conifers with masses of fibrous roots radiating from the base of the stem should be planted. Those grown in pots, and there are not many now, are quite unsuitable or rather unlikely to make fine healthy trees. The roots which have become cramped in the limited space of a pot and coiled round and round are unable to stretch themselves and their fibrils out naturally in search of food. They are huddled up in a mass like a ball, and can neither develop nor perform properly their natural duty. Where such plants must be used, it is a safe plan to completely wash all the soil away from the ball of roots. The latter can then be spread out as far as possible, and if not too tough or brittle pegged down. This will allow the soil to settle between them and induce the development of the important fibrous roots from the tips. Any time from November to March, always providing the weather be mild and the soil not too wet and sticky, is suitable for planting Conifers.

Propagation.—Conifers are multiplied by seeds, cuttings, layers, and grafting. Most of them are best obtained by seeds, but many of the non-fruiting kinds, like some of the Retinosporas, are usually obtained from cuttings, and others from layers. Grafting is practised in some instances, and there are many fine specimens of grafted Conifers in the country; but as a general rule grafted Conifers are not likely to attain the age or stand our climate like those on their own roots—whether obtained by seeds, layers, or cuttings. Perhaps if the proper relationship between the different species used for stock and scion were better understood, or as well understood as it is in connection with fruit trees, there would be no great harm in having grafted Conifers, but the chances are that all the finest species would be 'worked' or grafted on the commonest or most easily obtained stock, whether suitable or unsuitable. The planting of grafted Conifers, therefore, on the whole is not to be recommended.

Nomenclature.—There are few families of plants which have been so fearfully mismanaged at the hands of botanists as the Conifers. It is nothing unusual to find one plant with half a dozen or more different names, and there is scarcely one without at least one synonym, so that the greatest confusion has been brought about. One can understand *species* becoming a little mixed occasionally, but when *genera* like Picea, Abies, Pinus &c. get entangled, it is surely an indication that the dividing lines between them were not drawn with great rigidity. Thus what are called *Abies* in some parts of the country are called *Picea* in another part, and sometimes even *Pinus*. It is admittedly difficult to draw a botanical line between *Abies* and *Picea*, but the latter name is now usually taken as the generic title of the 'Spruces,' and the former for the 'Silver Firs.'

There is no intention of adding to the existing confusion of names. Those given by Dr. Masters in the 'Conifer Conference Report' will be used in this work, as being most generally acceptable; while with one or two trifling exceptions the main divisions of the order will be on the lines laid down by Bentham and Hooker, the distinguished authors of the 'Genera Plantarum.'

Except where otherwise stated, all the Conifers mentioned are evergreen.

Tribe I.—THE CYPRESS TRIBE (*Cupressineæ*).—Flowers monœcious or diœcious. Cones roundish or oblong; scales usually confluent with the bracts, fleshy, leathery, or woody when ripe. Seeds with or without wings. Trees or shrubs usually with the adult leaves adpressed, opposite, whorled in 3–4 rows, small, scale-like, rarely linear.

CALLITRIS. — A genus of tender shrubs or small trees with roundish or 3–4-angled, sometimes jointed branches, and small trapeziform leaves in whorls of 3–4, or opposite and decussate (4-ranked). Flowers monœcious. Male flowers in spikes, anthers crested with 2 or more lobes. Cones globular or somewhat 4-angled, and composed of 4-valved woody scales, the alternate pair much smaller.

C. quadrivalvis (*Tetraclinis articulata*).—*Arar tree.*—A graceful North African tree or shrub 15–20 ft. high, with flattened jointed leaves, and flowers and cones as described above.

Culture and Propagation.—This is the best known species, and except in the south of England and Ireland requires greenhouse protection in winter. It likes a light sandy loam, and may be increased by seeds sown in spring under glass or by cuttings of the ripened shoots in autumn under a handlight.

It is said that the woodwork of the cathedral of Cordova, which was built in the 9th century as a Moorish mosque, is of this tree.

FITZROYA. — A genus of much-branched trees or shrubs with small ternately whorled or 4-ranked loosely or closely imbricated leaves. Flowers diœcious. Cones star-like, having their axes terminating in 3 soft club-like glands or scales, and consisting of 9 scales, 3 in each whorl, the upper ones only seed-bearing. Seeds winged.

F. patagonica.—A native of the mountains of Western Patagonia, Chili &c., forming a tree 50–80 ft. high, having slender spreading branches incurved at the tips, and furnished with small ovate oblong flat blunt sessile leaves in 2–4 rows. Flowers and cones as above.

Culture and Propagation. — This species grows well in ordinary garden soil, and may be increased by seeds or cuttings like *Callitris*. At Powerscourt, co. Wicklow, there is a specimen about 20 ft. high—perhaps the largest in the kingdom.

LIBOCEDRUS (INCENSE CEDAR).—A genus of handsome Arbor Vitæ-like trees, with flattened branches and small flattened 4-ranked appressed or spreading leaves. Flowers monœcious or diœcious; male catkins nearly cylindrical; female ones solitary and round. Cones oval, more or less obtuse, woody, and composed of 4–6 flat and slightly concave scales in opposite pairs face to face and not overlapping; the middle pair only seed-bearing. Seeds with 2 unequal wings. Seed leaves 2.

Culture and Propagation.—The Incense Cedars are easily raised from seeds sown under glass in spring, the seedlings being afterwards planted out after hardening off. Cuttings of the partially or wholly ripened shoots will root in sandy soil under handlights, or in gentle heat, during August and September.

L. chilensis (*Thuya chilensis*). — A handsome densely branched tree which attains a height of 60–80 ft. on the Chilian Andes, but not more than 12–20 ft. in the British Islands. Leaves glaucous-green, bluntly oblong trigonous, appressed on flattened spreading and drooping branches, somewhat ascending towards the top. Cones ½ in. long, drooping on short stalks. The variety *argentea* has paler coloured leaves than the type, and *viridis* is a bright green form, devoid of a glaucous fringe.

Culture &c. as above. This species will stand 2° or 3° of frost without injury in sheltered spots.

L. decurrens (*Thuya craigiana*).—A beautiful and distinct Conifer from the mountains of California, where it attains a height of 50–150 ft. at elevations ranging between 3000 and 8500 ft. Leaves small and linear, bright glossy green, imbricating in 4 rows, decurrent at the base, and borne on plaited or flattened branchlets. Cones 1 in. or more long, olive-brown, erect and solitary at the tips of the upper branchlets. This plant is often erroneously called *Thuya gigantea* in gardens. There is a specimen over 50 ft. high at Orton Longueville, Huntingdon, the seat of the Marquis of Huntly. The variety *compacta* is denser and dwarfer in habit than the type, and *glauca* is distinguished by the glaucous-green 'bloom.'

L. doniana and *L. tetragona*, both beautiful trees, are scarcely hardy enough for permanent outdoor cultivation in the British Islands.

Culture &c. as above.

THUYA (ARBOR VITÆ). — A genus of ornamental trees or shrubs with small opposite scale-like appressed leaves, imbricated in 4 rows, on flattened branchlets. Flowers monœcious, the male catkins oval, the female catkins ovoid or oblong, solitary. Cones ovoid oblong, leathery and smooth, with a projecting tubercle below the tip of each scale. Scales 6–10, unequal, in opposite pairs, the 2 uppermost pairs seed-bearing. Seeds usually winged on both sides, except in *T. orientalis*.

Culture and Propagation. — The various species of Arbor Vitæ thrive in rich sandy loam, and may be increased in the same way as the *Libocedrus* by means of seeds sown under glass, and by cuttings of the more or less ripened shoots inserted in sandy soil under handlights or in cold frames in summer and autumn.

T. dolabrata (*Thuyopsis dolabrata*).— A beautiful tree from the mountains of Japan, where it grows 40–50 ft. high, but only about half that height in the most favoured parts of the British Islands. It has drooping flattened branchlets furnished with 4 rows of broad thick rounded oval scale-like imbricating leaves, furrowed along the centre, deep shining green above, silvery white beneath. Cones small ovoid or roundish, consisting of 8–10 woody scales. The variety *lætevirens* (or *nana*) is a beautiful dense-growing bush seldom exceeding 4–6 ft. high. It makes an excellent evergreen hedge, and bears clipping well. The variety *variegata* is recognised by its pale yellowish branchlets. It grows 15–20 ft. high.

There is a specimen of *T. dolabrata* about 40 years old at Boconnoc, Cornwall, over 25 ft. high.

Culture &c. as above.

T. gigantea (*T. Menziesi;* also *T. Lobbi*, and *T. craigiana* of gardens).— *White Cedar.*—A graceful pyramidal tree, native of N.W. America, where it reaches a height of 100–150 ft. and is found in 'low, rich woods and swamps, and less commonly on dry ridges and slopes below 5200 ft. elevation.' Leaves in alternate opposite pairs closely imbricated, and borne on flattened slender flexible branchlets. Cones small ovoid, tapering at both ends.

There are several varieties of *T. gigantea*, the best known being *atrovirens*, *aurescens*, *erecta*, *gracilis*, *pumila*, and *variegata*—names which convey their own meaning and indicate the peculiarity of the plants.

Culture and Propagation. — In the British Islands this tree flourishes in rather stiff or light moist loam, and sometimes, as at Linton Park, Maidstone, and Woodstock, Kilkenny, reaches a height of 60–65 ft. or more in the course of 30 years or so.

T. japonica (*Thuya Standishi*). — A native of the Japanese mountains, having straight flat 2-edged branches and bluntly ovate leaves, deep glossy green above, dull glaucous-white beneath, closely imbricated in opposite pairs and 4 rows.

This forms a nice small tree in cultivation, a specimen in the Duke of Buccleuch's garden at Dalkeith being about 20 ft. high. and about 25 years old.

Culture &c. as above.

T. occidentalis (*American Arbor Vitæ*). A beautiful tree 40–60 ft. high, native of the cold wet swamps and along the rocky banks of streams in N. America. Leaves very small in opposite pairs, bluntly ovate rhomboid, thickly imbricating in 4 rows along the branchlets. Cones obovoid, ½ in. long, shortly stalked. There are 50 or more garden forms of the American Arbor Vitæ supposed to be in cultivation, but they can all probably be reduced to about half a dozen. Those known as *alba*, *aurea*, *argentea*, *compacta*, *pendula*, and *variegata* are the most distinct, and the peculiarity of each is indicated by the name. *Ellwangeriana* is also an ornamental variety of compact and upright habit, much in demand, and in a small state very useful for the rock garden.

The American Arbor Vitæ does not appear to be a popular tree in either British or Irish gardens. In the returns from more than 100 of the largest gardens in Great Britain and Ireland, not a single specimen is mentioned, although a plant of the variety *pendula* over 15 ft. is recorded in Powerscourt Gardens, co. Wicklow.

Culture &c. as above.

T. **orientalis** (*Biota orientalis*).—*Chinese Arbor Vitæ.*—A graceful pyramidal tree or bush 18–20 ft. high, native of China and Japan. Its branches are more or less vertical or horizontal at first, but ultimately more or less parallel and pointing upwards. The very small imbricating ovate-rhomboid acute leaves are arranged in 4 rows along the branchlets, and the roundish cones are composed of 6–8 projecting or reflexed scales.

There are as many garden forms of the Chinese Arbor Vitæ as of the American one, and it is equally difficult to distinguish more than a few of them. There are silver, gold, glaucous, and variegated forms known respectively as *argentea*, *aurea*, *glauca*, and *variegata*; there are others called *compacta*, *gracilis*, *elegantissima*, *pyramidalis* &c., which may be applied to any forms answering the descriptions. The variety *pendula*, however, is a distinct shrub 10–15 ft. high, with long slender recurved branches and loosely drooping thread-like branchlets. It is probably better known to gardeners as *Biota pendula*, and the 'Weeping Arbor Vitæ.'

Culture &c. as above.

T. **plicata** (*T. gigantea plicata; T. occidentalis plicata; T. warreana*).—A native of Nootka Sound, N. America, where it becomes a handsome tree 50–65 ft. high, but rarely more than 20 ft. high in the British Islands. The long slender linear-pointed branchlets are furnished with bluntly ovate imbricated flat smooth small leaves in 4 rows, of a bright green above, and a dull glaucous-green beneath, those on young plants being very much pointed. Cones small, solitary, ovoid oblong. There is a tiny miniature form called *minima*, which scarcely grows more than 1 in. a year. The variety *variegata* has portions of the branchlets tinged with pale yellow, which intermixed with the green portions gives a pleasing effect. There is also a crested form, known as *cristata*, and a yellowish one called *lutea*.

Culture &c. as above.

CUPRESSUS (CYPRESS).—According to Dr. Masters 'true Cypresses are known by their scale-like appressed adult leaves never in two ranks, monœcious flowers, male flowers spiked, anthers crested—4 or more, pollen globose; cones globular or oblong, woody, ripening in the second year, with peltate scales and numerous seeds to each scale. Cotyledons 2, leafy, longer than the primary leaves, which are opposite or in whorls of 4.'

The plants known under the name of *Chamæcyparis* and *Retinospora* 'differ from the true Cypresses in having generally 2-ranked branchlets and flattened branch systems; smaller cones ripening the first year; the scales less woody, and usually with a smaller number of seeds.'

The Cypresses are among the most ornamental trees and shrubs in cultivation, and notwithstanding the sombre evergreen hue of many of them, they exhibit a good deal of colour and a variety of graceful forms.

Culture and Propagation.—They succeed in rich and rather moist but well-drained loamy soil, and may be increased by cuttings, layers, or seeds. As the seeds of the true Cypresses, as stated above, take 2 years to ripen, it is well to wait until the matured cones burst naturally before obtaining the seed for sowing purposes. In the Chamæcyparis section, which includes *C. lawsoniana*, *C. nootkatensis*, and *C. thyoides*, the cones usually burst open in spring, and their seeds may then be collected and sown in a warm light soil. Young plants will appear in 6 or 8 weeks, perhaps more, and may be allowed to stand until the following spring before transplanting them for the first time, after which they need not be moved for another year or two according to their growth. They are often grown on in pots in nurseries, but for the reasons stated above at p. 974 it is not advisable to use pot plants.

Cuttings of the tops of the growing or ripened leafy shoots, 2–3 in. long, inserted in cold shaded frames or under handlights in sandy soil will root. Ripened side shoots are preferable to unripened ones, and if placed in gentle heat about October and November will be well-rooted plants about February or March. Once roots are well formed the plants may be given more air and light, and by the end of May can be placed in cold frames, without however disturbing them from the pots or boxes in which they have rooted. In the autumn they may be planted in a cold frame, and by the following spring will be sturdy enough for the open ground. Old plants often have their branches bent down and pegged into the soil. The branchlets are surrounded with fine soil at the base, and in about 12 months may be detached with roots. The *Retinospora* section are often veneer-grafted on stocks of the American Arbor Vitæ, usually in winter and under glass.

C. funebris (*C. pendula; C. amœna*).—*Funeral Cypress.*—A graceful Chinese tree about 50 ft. high in a wild state, and having horizontal branches drooping at the extremities, thus giving a 'weeping' appearance, and covered with scale-like yellowish-green leaves.

Culture &c. as above.—This species is unsuitable for any except the mildest parts of the S. of England and Ireland, as it is readily injured by frost. There is a form called *glauca* with blue-green foliage.

C. goveniana (*C. californica; C. cornuta*).—A beautiful Californian Cypress 40–50 ft. in a wild state, but less than 20 ft. high in this country, forming a dense compact small tree. Leaves bright green, scale-like, closely imbricated. Male catkins yellow, freely produced in spring.

Culture &c. as above. This is safer in the most southern parts of the country, in rich moist well-drained soil.

C. guadeloupensis.—A beautiful tree 60–70 ft. high in its wild state on the rocky cañons and ridges on the New Mexico and Arizona mountains, where it forms extensive forests.

Culture &c. as above. This species is not very well known, but seems to be hardy except perhaps north of the Tweed, where it might require a little protection and shelter in winter. It is considered to be a form of *C. macrocarpa* by some.

C. lawsoniana (*C. fragrans*).—*Lawson's Cypress; Port Orford Cedar.*—This is one of the most graceful Conifers in cultivation. It is a native of California, where it forms a magnificent tree 150 to 200 ft. high in rich moist soil. At Dupplin Castle, in Perthshire, there is a specimen about 40 years of age and about 60 ft. high; and at Inverary Castle, the seat of the Duke of Argyll, is another over 40 years of age and over 50 ft. high. But most trees in the country are 20–30 ft. shorter than these. The small closely imbricated dark glossy green leaves are more or less tinged with a glaucous hue, and the cones about the size of small peas are borne in great profusion on the drooping feathery Fern-like branchlets. Fine specimens are pyramidal or cone-like in shape, gracefully nodding at the top. There are many charming varieties of Lawson's Cypress in cultivation, and they are all worth growing. The characteristics of most of them may be gleaned from the names, the best varieties being *albo-spica*, *albo-variegata*, *argentea*, *argenteo-variegata*, *aureo-variegata*, *erecta viridis*, *filiformis*, *gracilis pendula*, *lutea*, *nana*, *nana alba*, *nana glauca*.

Culture &c. as above. Besides seeds and cuttings, many forms of Lawson's Cypress are grafted upon stocks of the common form easily raised from seed.

C. Lindleyi (*C. Coulteri; C. knightiana; C. karwinskiana*).—A beautiful Mexican Cypress 40–60 feet high in its native state, and distinguished by its graceful drooping feathery branchlets and glaucous-blue scale-like leaves.

Culture &c. as above. This is suitable only for the most favourable parts of the south.

C. lusitanica (*C. glauca; C. pendula*). *Cedar of Goa.*—An elegant tree of uncertain origin, 40–50 ft. high, with a loose and gracefully drooping habit and acute minute keeled glaucous scale-like leaves. It may be a geographical form of *C. torulosa*. In Portugal there are trees over 150 ft. high and more than 250 years old. At Rossdhu, in Dumbartonshire, there is a fine specimen over 40 ft. high. although this species is usually considered to be suitable only for southern parts.

Culture &c. as above.

C. macnabiana (*C. glandulosa; C. nivalis*).—A pretty pyramidal tree, native of N. California, where it sometimes grows 30 ft. high, but is more often a tall shrub branching upwards from the ground, and is remarkable for the dull purple-red colour of its branches. The small scale-like deep green leaves are arranged in 4 rows on the rigid branchlets, and the globular cones have roundish or blunt scales, each having a thick projecting recurved point.

Culture &c. as above. This rare species is probably hardy except in the bleakest and coldest parts of the kingdom.

C. **macrocarpa** (*C. lambertiana fastigiata; C. Hartwegi; C. Reinwardti*).—*Monterey Cypress.*—A beautiful quick-growing tree, native of South California, where according to Hartweg, who discovered it in 1847, it attains a height of 60 ft., and has far-spreading branches, flat at the top like a full-grown Cedar of Lebanon, which it closely resembles when seen at a distance. The branchlets are furnished with small scale-like deep green leaves, and the scales of the roundish or oblong cones 1–2 in. long have somewhat projecting and recurved centres. At Carclew in Cornwall there is a specimen about 85 ft. high, the girth of the trunk at 3 ft. from the ground being nearly 11 ft. At Coollattin in Wicklow a specimen under 50 years of age is 65 ft. or more high.

Culture &c. as above. It seems to thrive in most parts of the country and by the sea.

C. **nootkatensis** (*Chamæcyparis nutkaënsis*).—*Alaska Cypress.*—A handsome and valuable tree, native of Vancouver's Island, British Columbia &c., where it reaches a height of 100–125 ft., with a trunk 4–6 ft. in diameter, but it attains only about half these dimensions in the British Islands. The branches are somewhat erect with distichous branchlets elegantly recurved at the tips, and covered with small rich dark green acute leaves, slightly glaucous on the lower or shady side of the branches. The scales of the globular cones about ½ in. in diameter have a cone-like boss or projection in the centre. There are several distinct varieties, all with more or less descriptive names, such as *argenteo-variegata*, *aureo-variegata*, *compacta*, *glauca*, *pendula*. *variegata*, *viridis* &c.

Culture &c. as above.

C. **obtusa** (*Chamæcyparis obtusa; Retinospora obtusa; Thuya obtusa*).—A handsome Japanese tree 70–100 ft. high in a wild state, with spreading fan-like branches and scaly leaves mostly in whorls of 4, ovate rhomboid, blunt or seldom pointed, and closely pressed to the branchlets.

There are many charming varieties of this species, better known perhaps in gardens under the name of *Retinospora*. The best for gardens are *albo-picta*, *aurea*, *compacta*, *filicoides*, *gracilis aurea*, *lycopodioides*, *nana*, *plumosa* with its sub-varieties *albo-picta*, *argentea*, *aurea; tetragona aurea* and *variegata*—names which explain the peculiarities of each. There is a specimen of *C. obtusa* at Carclew, Cornwall, about 25 ft. high.

Culture &c. as above.

C. **pisifera** (*Chamæcyparis pisifera; Retinospora pisifera; Thuya pisifera*). An elegant Japanese tree found growing with *C. obtusa*, but much smaller and more slender in habit. It grows 18–20 ft. high at the most in British gardens, and has its numerous branchlets covered with 4 rows of smooth scale-like leaves, the upper and lower ones tapering to a hard point, and keeled behind; the side ones almost sickle-shaped and marked beneath with 2 white bands. There are several varieties, the most distinct and constant being *filifera*, with slender thread-like branchlets; *plumosa*, which represents a feathery intermediate stage between young and old plants; and *squarrosa*, a young bushy glaucous form with spreading linear leaves. There are also gold and silver variegated forms like those of *obtusa*, and all better known in gardens as *Retinosporas*. These varieties, as Dr. Masters says, represent more or less permanent stages of growth, but inasmuch as they pass one into the other by intermediate gradations, and as the various forms may be met with on one and the same tree, not only at different times but sometimes simultaneously, it is obvious they have no claim to specific rank.

Culture &c. as above.

C. **sempervirens** (*C. fastigiata; C. pyramidalis; C. whitleyana*).—A handsome tall tapering S. European Conifer, with erect branches growing close to the trunk, and with frond-like branchlets covered with smooth imbricated yellowish-green leaves. The cones are about 1 in.

across and usually produced in pairs. There are a few forms of this species, such as *horizontalis*, *expansa*, *orientalis*, and *thuyæfolia*. A slender cone-like specimen more than 50 years old and over 40 ft. high is in the gardens of Sir J. M. Stirling-Maxwell, Bart., Keir, Perthshire.

Culture &c. as above.

C. thyoides (*Chamæcyparis sphæroidea; Retinospora ericoides*).—A beautiful, valuable and quick-growing Cypress, native of the United States, where it is known in parts as the White Cedar, and attains a height of 80–90 ft. It has a slender tapering trunk and branchlets covered with very small, closely imbricated light green leaves furnished with a small tubercle about the centre. Cones small, roundish, about the size of peas, each scale having 2 seeds. The variety *glauca* (or *kewensis*) differs from the type in being more compact, denser, and of a silvery glaucous hue. The variety *variegata* is a dwarfer growing plant having the upper portions of the branchlets and foliage of a rich golden-yellow. *Retinospora leptoclada* is probably only a form of this species. There is a fine ornamental tree of *C. thyoides* at Murthly Castle, Perthshire, under 50 years of age and about 50 ft. high.

Culture &c. as above. Damp or moist situations suit it and its varieties well.

C. torulosa (*C. cashmeriensis; C. nepalensis*).—A beautiful much-branched Conifer, native of the western Himalayas, where it grows 50–70 ft. high, having a graceful pyramidal habit, and short slender twisted branchlets, covered with minute glaucous leaves in 4 rows, closely appressed to the stems. There are two varieties known—*corneyana*, and *majestica*—the former with slender drooping branchlets but rather too tender for the colder parts of the kingdom.

Culture &c. as above.

JUNIPERUS (JUNIPER).—A genus containing about 27 species of trees or shrubs, often with two kinds of leaves and monœcious or diœcious flowers. Leaves needle-shaped linear or lanceolate, rigid or flexible or scale-like, scattered or imbricated, not clustered. Male flowers solitary or in crowded catkins. Cones small roundish, berry-like, composed of 3–6 decussate or whorled, confluent fleshy scales in which the erect seeds are embedded. Fruit berry-like, ripening the second year. Embryo with two blunt leafy cotyledons.

Culture and Propagation.—The Junipers are mostly ornamental trees or shrubs, some of which are suitable for the lawn and some for the rock garden or for making screens, according to habit. They succeed in a rather heavy loamy soil, and may be considered hardy in most parts of the British Islands. They are increased easily from seeds, but the latter often take a year or so to germinate. The process may be hastened somewhat by removing the pulp by soaking the berries in water, and mixing with sand for a few days. Cuttings of the green shoots will root under glass in fine sandy soil in early summer, and of the ripened shoots in autumn under handlights or cold frames. Some varieties root more readily than others. Old plants may also be layered, and choice varieties may be veneer grafted on the stocks of the Common Juniper, under glass in winter.

The following is a list of the most ornamental Junipers for cultivation in the open air in our climate:—

J. chinensis (*J. japonica; J. flagelliformis; J. reevesiana*).—A beautiful diœcious shrub native of China, Japan, the Himalayas &c. It has a pyramidal habit with short branches and two kinds of leaves, the male and female plants being distinct from each other. The small scaly linear leaves are opposite or in whorls of three. The male plant is more ornamental than the female and has somewhat drooping branches with deep green foliage, often with a glaucous hue. The female plant bears brownish-violet berries. There is a specimen of the Chinese Juniper in Murthly Castle gardens, Perthshire, over 40 years of age, and now, perhaps, more than 30 ft. high.

There are several varieties known, the chief being *albo-variegata*, *aurea*, *densata*. *japonica*—a dwarf bush about 2 ft. high, suitable for rockeries; also its sub-variety *aurea*; *glauca*, and *leeana*, the latter a vigorous shrub with leaves ½ in. long.

Culture &c. as above.

J. communis (*Common Juniper*).—A native of the temperate parts of the N. hemisphere, including the British Isles, forming an ornamental bush 3–20 ft. high, according to its northern or southern habitation. It has stiff awl-shaped leaves opposite or in threes, usually glaucous above and green below. Cones fleshy, ¼–⅓ in. across, blue-black, glaucous.

Culture &c. as above.—There are several varieties of the Common Juniper, but *hibernica* (or *fastigiata*), the Irish Juniper, and its prettily variegated form are, perhaps, the best known. The Irish Juniper has a columnar habit and a peculiar silvery glaucous hue. It thrives on cool loamy clay and peaty soil, and is often used as a stock for grafting. Other forms in cultivation are *alpina*, *glauca*, *hemisphærica*, *oblonga* and *reflexa*.

J. drupacea.—An ornamental species 10–25 ft. high, native of the mountains of Northern Syria, with broad stout sharp-pointed pale green leaves arranged in threes, and deep purple fruits about the size of a Sloe, covered with a glaucous 'bloom.'

Culture &c. as above. Well-grown specimens look handsome on lawns or grassland.

J. excelsa. — A handsome compact-growing pyramidal Juniper 10–30 ft. high, native of Asia Minor, with thick decurrent greyish-green leaves opposite or in threes or short much-ramified branches. There are a few forms grown, such as *venusta*, *stricta*, and *Perkinsi*.

Culture &c. as above. In northern and unsheltered parts this species is apt to be injured by frost, and is therefore better for the milder parts of the country. The variety *stricta* seems to be equally tender. It differs from the type in having a more tapering outline and more glaucous leaves.

J. occidentalis.—A handsome pyramidal tree, native of the Western United States, where it often grows 30–50 ft. high on the dry rocky ridges and prairies. Its branches emit a strong smell when bruised. The leaves are in whorls of three, and in a young state are spreading, sharp-pointed and glaucous, while the small deep purple berries have a glaucous 'bloom.'

Culture &c. as above. An excellent lawn plant.

J. Oxycedrus.—A large bushy Juniper 10–12 ft. high, native of Spain and Portugal, and Southern Europe generally. It has slender drooping branches clothed with sharp-pointed leaves which are broader and shorter than those of the common Juniper, and more distinctly veined with white beneath.

Culture &c. as above. In the mild southern and western parts of the kingdom this species attains larger proportions and a more elegant habit than in the bleak north.

J. phœnicea (*J. bacciformis; J. langoldiana; J. tetragona*).—A beautiful pyramidal shrub or small tree 15–20 ft. high, native of the Mediterranean region, and distinguished by its tufts of slender drooping branches covered with small scale-like leaves in whorls of three. There is a whitish-looking variety called *turbinata*, and one called *filicaulis*.

Culture &c. as above.

J. recurva.—A handsome Himalayan Juniper 5–8 ft. high, with drooping feathery recurved branchlets, and loosely imbricated sharp-pointed greyish-green leaves usually arranged in threes. The name *densa* is given to the male form, which is dwarfer and more compact in habit, and has also shorter leaves than the female. The variety *squamata* (*J. dumosa*) extends from the Himalayas to China and Japan at elevations of 10,000–15,000 ft. and is recognised by its peculiar creeping and spreading habit, numerous short, stiff branchlets, and rigid, sharp-pointed, scaly, glaucous leaves. There is a fine bushy specimen of the typical *J. recurva*, over 40 years old and more than 30 ft. high, at Keir House gardens, Perthshire. There is also a weeping form called *pendula*.

Culture &c. as above.

J. rigida. — A beautiful Japanese Juniper 15 ft. or more high, with an upright and rather irregular habit, and drooping branches, which when young are slender, bright green, and slightly tinged with yellow. The leaves, which are arranged in threes, are about ½ in. long, linear, rigid, erect, sharp-pointed, with a glaucous furrow on the upper side.

Culture &c. as above.

J. Sabina (*Common Savin*).—A beautiful branching shrub, 5–8 ft. high, native of S. Europe, with an irregular spreading habit, and numerous more or less upright or trailing branches, furnished with small scale-like pointed leaves. The upright variety is suitable for making hedges, screens &c., while the creeping form is handsome, trailing over boulders of rock in large rock gardens. Among other forms may be mentioned the following distinct ones:—*J. procumbens* (*J. prostrata*; *J. repens*), a native of Canada and the N. United States; is a variety with a creeping spreading habit, and glaucous leaves. The variety *tamariscifolia* (*J. sabinoides*), sometimes called the 'Carpet Juniper,' is an elegant trailing bush, with bright green foliage. The variety *variegata* has its branchlets distinctly and prettily variegated with creamy white or pale yellow, and retains its character much better in partially shaded positions.

Culture &c. as above.

J. sphærica (*J. Fortunei*).—A native of N. China, with an upright habit, tufted branches and greyish-green scale-like leaves. The berries are roundish in shape and are often found in great profusion on some branches but not on others. The variety *glauca* or *Sheppardi* is distinguished by its stiff needle-like sharp-pointed leaves, which become very glaucous or silvery white in autumn.

Culture &c. as above.

J. thurifera (*Frankincense Juniper*). A handsome pyramidal tree 15-25 ft. high, native of Spain and Portugal, with an erect slender tapering trunk and a pyramidal habit. The numerous slender and much-divided branches are densely clothed with pale glaucous green awl-shaped leaves arranged in opposite pairs.

Culture &c. as above

J. virginiana (*Red Cedar*).—A very ornamental tree widely distributed throughout the United States, where it grows in such widely different situations as dry gravelly ridges and limestone hills, or near the coast in deep swamps, and attains a height of 80-90 ft., but is often reduced to a low shrub. It has a pyramidal habit, and its branches, at first erect, ultimately bend down, and have numerous crowded branchlets, covered with awl-like scaly imbricating leaves. In the British Islands it does not usually grow more than 15-20 ft. high, but at Studley Royal, in Yorkshire, the seat of the Marquis of Ripon, there is a very fine aged specimen over 70 ft. high. There are several varieties of the Red Cedar, including white (*albo-variegata*) and golden variegated (*aureo-variegata*) and weeping (*pendula*) ones; also *bedfordiana*, a handsome form, once distributed as *J. gossainthaineana*, having long slender drooping branches; *elegans*, a free-growing variety spotted with creamy white; *glauca*—the Silver Cedar—a pretty pyramidal tree, thickly branched upwards from the ground, and remarkable for the whitish or glaucous appearance of its young growths; other more or less distinct forms are *horizontalis*, *humilis*, *Schotti*, and *tripartita*.

Culture &c. as above.

Tribe II. — TAXODIUM TRIBE (*Taxodieæ*). — Large trees with evergreen or deciduous leaves spirally arranged, but apparently in two or more rows, or in tufts. Flowers monœcious. Cones globular or oblong, more or less woody, with scales spirally arranged. Seeds 2-6 to each scale, erect or inverted, winged.

CRYPTOMERIA (JAPAN CEDAR). A genus of evergreen trees with alternate linear leaves spirally arranged and irregularly 3-4-sided. Male catkins numerous, collected in clusters at the ends of the branches; female ones usually solitary, or 2-3 together. Cones almost globular, solitary or in clusters, somewhat prickly when ripe. Seeds erect, 4-5 to each scale, slightly winged. Seed leaves 2-4, leafy. First leaves in whorls of threes.

C. japonica (*C. Fortunei*; *Cupressus japonica*; *Taxodium japonicum*).—An elegant Japanese tree with a beautiful straight tapering trunk, and in a wild state attaining a height of 130-150 ft. high, with a diameter of 4-5 ft. at the base. The brittle branches are spreading, the lower ones being deflexed, but ascending at the tips, and having numerous bright green branchlets covered with stiff incurved spirally arranged leaves 6-9 in. long, decurrent at the base. Cones roundish, about ½ in. in diameter. There is a very fine specimen about 45 years old, and about 70 ft. high, at Coollattin Park, co. Wicklow.

C. japonica is now considered to be the only species, the other plants in cultivation being varieties of it. Of these *elegans* is a beautiful tree with short horizontal branches and branchlets drooping at the ends, and covered with flat linear softish leaves, channelled on both surfaces. In autumn they assume a pleasing bronzy-crimson tint which remains throughout the winter. The variety *Lobbi* (*C. viridis*) is more compact and less drooping in habit than the type, and has brighter richer green and shorter leaves more closely pressed to the branches. *Nana* (or *pygmæa*) is a small stunted bush, seldom attaining a greater height than 2 or 3 feet, and useful for rock gardens. The variety *spiralis* has a slender habit and sickle-shaped leaves curiously wound round the branchlets.

Culture and Propagation.—Cryptomerias are practically hardy in most parts of the British Islands, but in some localities the shoots and tops are apt to be injured by severe frosts. As a rule they flourish in light rich loamy soil, with abundance of moisture, and are safest where they are sheltered by other trees. They may be increased by seeds sown in light sandy soil in cold frames when ripe, or by cuttings of the half-ripened shoots in summer in a similar compost protected under a handlight or cold frame and shaded from the sun.

TAXODIUM.—A genus of handsome loosely branched trees with spreading or drooping branchlets and deciduous or partly persistent more or less spirally arranged or 2-ranked leaves. Male flowers in branched catkins; the female ones 2-3 together near the base of the male branches. Cones hard, round or ovoid, with an uneven surface. Scales spirally imbricated, thick and raised in the centre. Seeds erect, angular with projecting points, wingless. Seed leaves 6-9, three-angled. This genus now includes *Glyptostrobus*, which is distinguished by having winged and erect seeds.

Culture and Propagation.—Taxodiums flourish under the same conditions as the Cryptomerias, but require more moisture and stand a good deal of frost without injury in sheltered localities. In many places fine healthy specimens may be seen growing in shallow ponds or lakes where a foot or two of water will cover the roots in winter. They may be readily increased by seeds, which should be sown in cold frames as soon as ripe. Cuttings of the young shoots inserted in wet sand, or even in water, will root in a week or two under glass. They must be shaded from strong sunshine and kept close until fairly well rooted.

T. distichum (*T. adscendens; T. microphyllum; Cupressus disticha*).—*Deciduous Cypress.*—A beautiful tree, native of the United States, where it forms extensive forests, growing in 'deep submerged swamps, river bottom lands, and pine-barren ponds,' and attains a height of 80-150 ft. with a trunk 6-13 ft. in diameter. It has stout stiff horizontal branches ascending at the tips, the side ones more or less drooping, and elegant slender pinnate branchlets furnished with two rows of flat comb-like horizontally spreading leaves, twisted at the base, and tapering to a sharp point, bright green in summer, changing to a dull red in autumn. They ultimately fall and leave the branches bare during the winter months, hence the popular name.

There are several varieties of the Deciduous Cypress, the most important being *pendulum* or *microphyllum* (*Glyptostrobus pendulus*), *fastigiatum*, *denudatum*, and *nanum*—the latter forming a compact bush 10-12 ft. high.

There are some fine specimens of the Deciduous Cypress 80-90 ft. high at Syon House, Isleworth, and Kew Gardens. There is a beautiful specimen of the variety *pendulum* nearly 60 years of age and more than 50 ft. high at Hewell Grange, Bromsgrove, Worcestershire, the seat of Lord Windsor.

Culture &c. as above.

T. heterophyllum (*T. sinense; Glyptostrobus heterophyllus; G. pensilis*).—*Embossed Cypress.*—A graceful Chinese species with erect stems branching at the tops, and having alternate branchlets covered with variable small more or less ovate scaly or rather long leaves, sometimes pressed close to the shoots and decurrent at the base, sometimes two-ranked, regularly twisted, and almost awl-shaped. Cones at the ends of the shoots ovoid or oblong cylindrical.

Culture and Propagation.—This species is not much grown, and does not seem to be very hardy north of the Thames. In the most favourable parts of the country it may succeed well. It may be raised from seeds or veneer grafted on stocks of *T. distichum* in winter under glass.

T. mucronatum (*T. mexicanum; T. Montezumæ*).—*Montezuma Cypress.*—This is a native of Mexico, where it forms large forests on the mountains at an elevation of 5000-8000 ft., and in the city of Mexico itself are to be found 'enormous and grand trees' over 120 ft. high. Botanically it is probably only a geographical form of the Deciduous Cypress (*T. distichum*), which it much resembles in habit and growth. It is too tender for any except the mildest and most sheltered parts of the British Islands.

Culture &c. as above.

SEQUOIA.—A genus containing two species of gigantic evergreen much-branched trees with alternate spirally arranged leaves, often almost lance-shaped and distichously spreading in *S. sempervirens*, often shorter and blunter in *S. gigantea*. Flowers monœcious, male flowers in stalked oblong or globose heads at the ends of the branches. Cones ½-2 in. long, ovoid or oblong, woody. Seeds 4-9, winged.

Culture and Propagation.—Sequoias flourish in light loamy soil in most parts of the British Islands, although in some localities they prove more or less unsatisfactory from an ornamental point of view, especially when fully exposed to keen biting winds from the north and east. The finest specimens are undoubtedly those growing with and sheltered by other large trees.

When seeds can be obtained, Sequoias are best increased by their means. Cuttings of the ripened shoots inserted in sandy soil in autumn under a handlight or cold frame will root fairly well if shaded from bright sunshine and kept rather close and moist. When rooted more air and light may be given on all favourable occasions. The variegated forms are usually grafted under glass on stocks of the common form.

S. gigantea (*Wellingtonia gigantea; Washingtonia Californica*).—*Mammoth Tree.*—A tall and stately Conifer with much-divided horizontal branches, and cylindrical, often drooping branchlets, thickly covered with spreading needle-shaped spirally arranged leaves, varying a good deal in the young and old branches. Cones solitary on the ends of the branchlets, about 2 in. long, egg-shaped.

There are several garden varieties, the best being *pendula*, which has regular drooping branches producing an elegant cone-like tree. The variety *aurea* has the smaller branchlets tinged with yellow, and when in good condition is rather pretty.

Pages of print have been written in all kinds of publications about this species, which forms one of the largest trees in the world. It is a native of California, where on the western slopes of the Sierra Nevada it reaches a height of 250-400 ft., with a trunk 20-40 ft. in diameter. The largest trees in the British Islands are not more than 80 or 90 ft. high, and they are very few and far between. Specimens between 30-50 ft., however, are fairly common, and there is scarcely a garden of any pretension that does not contain at least one 'Mammoth tree.' Seedling plants were first distributed about the time of the Crimean War (1854-55), so that the largest trees in the country are still a few years short of being half a century old, and may be regarded as fairly quick growers. The great height of the Sequoia is only exceeded by that of the Gum trees (*Eucalyptus*) of Australia, some of which are 450 ft. high.

Culture &c. as above.

S. sempervirens (*Taxodium sempervirens*).—*Californian Redwood.*—A large Californian tree often 200-300 ft. high in a wild state, with a trunk 8-23 ft. in diameter, sending up from the stump when cut down many vigorous shoots. According to Professor Sargent, it is found chiefly on the sides of cañons and gulches in low wet situations, borders of streams &c., not appearing on dry hillsides. It has horizontally spreading branches and numerous branchlets, frequently drooping and covered with blunt linear flat shining leaves ½-1 in. long, in two rows; they assume a purple-brown tint in winter, and often remain a long time or at least until the new leaves have been well developed. Cones egg-shaped, about 1 in. long.

There are only a few varieties of the Redwood, the chief being *albo-spica*, in which the tips of the young shoots are of a creamy white colour; *glauca*, with glaucous-blue leaves on branchlets, much narrower and more slender than in the type; and *taxifolia*, which scarcely differs from the type except in its slightly broader leaves. At Boconnoc in Cornwall there is a specimen of the Redwood about 50 years old and nearly 80 ft. high, with a girth of over 13 ft. breast-high.

Culture &c. as above.

Tribe III.—YEW TRIBE (*Taxeæ*).—Evergreen trees or shrubs, usually with diœcious flowers. Male flower consists of anthers on short stalks inserted on all parts of the axis. Filaments short, prolonged in a shield or scale-like connective. Female flowers naked, solitary, or rarely two under each bract. Fruit more or less drupaceous, always 1-seeded. This tribe and the next constitute the order TAXACEÆ of some authors.

CEPHALOTAXUS (CLUSTER-FLOWERED YEW).—A small genus of evergreen Yew-like trees, with alternate spirally arranged 2-ranked spreading shortly stalked linear leaves and diœcious flowers; male flowers in catkins or heads; female flowers at the tips of the branches. Fruits Plum-like, 2–3 in a head. Seeds about the size and shape of a Damson, roundish, with a bony or woody shell enclosed in a fleshy cup. Seed-leaves two, short.

Culture and Propagation.—The species of Cephalotaxus flourish in rich loamy soil, and make ornamental bushes in situations sheltered from north and east winds. They may be increased by seeds. As they do not thoroughly ripen until the second year, they should be allowed to remain on the plants as long as possible before picking. Cuttings of the ripened shoots will also root in sandy soil if inserted in August and September in cold frames or under handlights, kept close for a time, and protected from strong sunshine.

C. drupacea (*C. coriacea; C. fœminea; Podocarpus coriacea*).—A beautiful Japanese shrub 6–8 ft. high, with crowded linear leaves 1–2 in. long, yellowish glossy green above, glaucous beneath, and arranged in two opposite rows. Fruit ovoid oblong, purple, about 1 in. long.

Culture &c. as above.

C. Fortunei (*C. filiformis; C. mascula; C. pendula*).—A handsome Chinese shrub 6–8 ft. high, with long slender drooping branches and linear-pointed leaves 3 in. or more long, dark green above, paler beneath, and arranged in two rows.

Culture &c. as above.

C. pedunculata (*Taxus Harringtonia; T. sinensis*).—*Lord Harrington's Yew.*—A native of Japan and China 6–8 ft. high, with linear leaves 1–2 in. long, bright green above, marked with two broad glaucous lines beneath, and arranged in two rows. Fruit large, Plum-like, on long stalks.

The variety *fastigiata* (*Podocarpus koraiana; Taxus japonica*) is distinct and ornamental, and is readily recognised by its upright branches having the leaves scattered or spirally arranged on them; *sphæralis* is so called chiefly on account of its spherical berry-like fruits.

Culture &c. as above.

TAXUS (YEW).—A genus of evergreen trees, rarely shrubs, with more or less spirally arranged leaves often spreading in two rows, shortly stalked, linear, flat, often sickle-shaped. Flowers diœcious; stamens in stalked heads. Fruit solitary, 1-seeded, seated in a fleshy open scarlet cup or 'aril.' Seeds nut-like with a bony shell, the upper portion exposed. Seed leaves two, flat, green.

Culture and Propagation. — Yews flourish in almost any soil, but make the finest specimens on rich loamy land. They may be increased by seeds, which should be sown as soon as gathered after having been freed from the fleshy axil. If kept over until spring they should be mixed with damp sand, and turned over from time to time. Cuttings of the ripened shoots will root in sandy soil in August and September under handglasses or cold frames. The choicer varieties are usually grafted on common stocks, those of a weeping or drooping habit being placed on tall stems. When convenient the branches may also be layered during the summer and autumn months.

T. baccata (*Common Yew*).—A well-known tree widely distributed over the whole of the N. temperate hemisphere, and attaining a height of 15–50 ft. in the British Islands. Its spreading and more or less ascending branches are furnished with more or less sickle-shaped acute linear leathery leaves ⅓–1½ in. long, deep shining green above, paler beneath. The male catkins are yellow, about ¼ in. long. Fruit ½ in. long, rounded, with a red mucilaginous cup or aril in autumn.

There are several more or less distinct varieties, including the following:—

T. adpressa (*T. tardiva; Cephalotaxus tardiva*).—A dense spreading bush 6–8 ft. high, raised from seeds more than 60 years ago, and distinguished from the type by its oblong oval acute crowded dark glossy green leaves, glaucous beneath, and pale pink fruits. *T. Dovastoni*, the Weeping Yew, is a distinct and handsome form with drooping branchlets. There is a sub-variety of it called *variegata*, in which the young leaves are broadly edged with golden-yellow, but when old they are of a bright green edged with silver.

T. fastigiata (or *hibernica*), the Irish or Florence Court Yew, is a handsome pyramidal or columnar bush 6–8 ft. high, with deep shining green linear leaves scattered along the branches in tufts. There are golden (*aurea*) and silver (*argentea*) variegated forms of the Irish Yew, which are both handsome.

There are many other forms to which distinctive names have been given, but that with beautiful golden-yellow fruits known as *fructu luteo*, and *Jacksoni*—a weeping kind with more or less curved reddish-brown branches and pale green sickle-shaped leaves—are the most distinct. The following names will give a good idea of the character and variability of many of the forms of Yew met with here and there in gardens:—*erecta*, *ericoides*, *glauca*, *gracilis pendula*, *horizontalis*, *nana*, *procumbens*, *pyramidalis* &c.

The Common Yew is not only useful and ornamental as solitary specimens dotted here and there in large gardens, but it also makes excellent hedges, and will flourish under the drip and shade of other trees. It is most accommodating, and as a screen for more tender subjects is not to be despised. It attains a great age, and like the specimen in Darley Dale churchyard, Derbyshire, assumes grand proportions. This tree has a girth of 33 ft., and is said to be 3000 years old. A very old and very large Yew tree, mentioned in Domesday Book, was a few years ago successfully transplanted from Buckland churchyard, near Dover, a distance of several hundred feet, and is now, I believe, in the best of health.

Culture &c. as above.

T. brevifolia (*T. Boursieri; T. lindleyana*).—*Western* or *Californian Yew.*—A handsome Californian tree 30–40 ft. high, with very long drooping slender yellow-barked branches, and linear sickle-shaped leaves ¾–1 in. long, arranged in 2 rows, shining yellowish-green above, glaucous beneath, with a very short yellowish stalk. In a wild state this Yew reaches a height of 60–80 ft.

Culture &c. as above.

T. canadensis (*T. baccata var. canadensis*).—*American Yew; Ground Hemlock.*—A spreading bushy species 3–4 ft. high, native of Canada and the N.E. United States, having slender horizontally spreading branches and narrow linear crowded leaves, more or less in 2 rows, about 1 in. long, spiny-pointed, pale glossy yellowish-green above, dull red beneath. There is a variegated form (*variegata*) in which the ends of the young shoots are whitish, those lower down being edged with white, while the older leaves are glossy green as in the type. In the variety *aurea* the foliage is yellowish in colour.

Culture &c. as above.

T. cuspidata.—A beautiful Japanese shrub or small tree 15–20 ft. high, with numerous spreading branches having stiffish angular branchlets. Leaves ¾–1 inch long, linear, curved upwards, deep glossy green above, pale yellow-green beneath, spiny-pointed, more or less in 2 rows on the leading shoots, somewhat clustered on the branchlets, and borne on rather long stalks broadly decurrent at the base.

Culture &c. as above.

TORREYA (Fetid Yew).—A genus of strong-smelling Yew-like evergreen trees with linear leaves, arranged more or less spirally in 2 rows, and diœcious flowers; the male flowers solitary and nearly sessile in the leaf axils; the female ones axillary, 2–3 together. Fruit erect, about the size of a Walnut, green and fleshy when ripe, 1-seeded. Seed with albumen ruminated like that of the Nutmeg, and covered with a hard bony shell. The aril or cup at the base of the fruit in this genus remains undeveloped.

Culture and Propagation.—When well grown in light loamy soil in warm and sheltered situations, the Torreyas form very ornamental bushes or small trees. They are easily increased by seeds sown in spring, the fruits having been previously mixed with moist sand so as to remove the fleshy outer covering. Cuttings of the fairly well-ripened shoots may also be inserted in August and September in sandy soil in cold frames or under handlights, which should be protected from strong sunshine until roots have been developed. Layers of the lower branches may also be made during the summer and autumn.

T. californica (*T. Myristica*).—*Californian Nutmeg.*—A handsome Californian tree 20–40 ft. high, with linear lance-shaped spiny-pointed pale yellow-green leaves 2–3 in. long, and Plum-like green leathery fruits about 2 in. long when fully ripe.

Culture &c. as above.

T. grandis (*Cephalotaxus umbraculifera*).—A noble Conifer, native of N. China, where it grows 60–80 ft. high. It is remarkable for having its branches in whorls radiating from the main stem like the wires of an umbrella, and having branchlets in 2 rows, covered with very stiff linear lance-shaped or somewhat sickle-shaped pointed leaves 1–1½ in. long, light glossy green above, the under surface being much paler and having 2 narrow greyish lines or furrows. Fruit green, about the size of a small Walnut and having 2 narrow greyish lines or furrows. This species does not smell so strongly as the others when bruised or burned.

Culture &c. as above.

T. nucifera (*Podocarpus coriacea*).—A pretty Japanese tree 20–30 ft. high, closely related to *T. grandis*, having branches in whorls, and straight flat linear spiny-pointed leaves 1–1¾ in. long, deep glossy green above, glaucous-white beneath. Fruits ovoid or oblong, about ¾–1 in. long, glossy green.

Culture &c. as above.

T. taxifolia (*Stinking Cedar*).—A strong-smelling Conifer, native of Florida, where it grows 40–50 ft. high, having spreading branches mostly in whorls, and stiffish linear somewhat sickle-shaped leaves 1 to 2 in. long, twisted and decurrent at the base, glossy green above, pale glaucous-blue beneath, with 2 narrow reddish furrows on each side of the midrib. Fruit ovoid pointed, about the size of a small Walnut.

Culture &c. as above.

GINKGO (MAIDENHAIR TREE).—This genus contains only one species :—

G. biloba (*Salisburia adiantifolia*). A very ornamental Chinese and Japanese tree 60–80 feet high, having branches in whorls, and fan-shaped irregularly notched deciduous leaves, greatly resembling the pinnules of the Maidenhair Fern in shape and veining, only of course being much larger, and very leathery in texture. The flowers are diœcious, the male ones being in umbellate drooping spikes or catkins, the female ones in terminal clusters on long stalks. Fruit drupe-like, with an edible fleshy pulp enclosing a single Almond-like seed with a hard bony shell. Cotyledons 2. There are several forms of the Maidenhair Tree, the most noteworthy being *laciniata* (or *macrophylla*), which differs from the type in having larger leaves, some of them being 10 in. in circumference, and divided into 2, 3 or 5 lobes, the principal ones being again divided, wavy, and irregularly toothed or laciniated; *fastigiata* has an erect Lombardy Poplar-like habit; *pendula* has a drooping habit; *variegata* with variegated foliage, and *aurea* with more or less golden-yellow leaves.

Culture and Propagation.—The Maidenhair Tree, as it is popularly known, is a quick-growing Conifer, and is practically hardy in most parts of the British Islands when grown in warm sheltered situations and in light loamy soil. There is a magnificent example in Kew Gardens near the Ferneries. It does not fruit in this country, but in S. Europe produces seeds freely. Plants are easily raised from imported seeds sown in spring, but when these cannot be obtained, cuttings of the ripened or partially ripened shoots will readily root in sandy soil under handlights or in cold frames during the summer and autumn months. Where the branches admit, layers may also be made. The rarer varieties may also be increased by grafting on stocks of the ordinary variety under glass in winter. The mode of germination from seeds will be found illustrated in the 'Gardeners' Chronicle,' March 2, 1889, p. 269.

DACRYDIUM.—A genus of much-branched evergreen trees and shrubs with small spirally clustered leaves and diœcious flowers. Male flowers in ovoid catkins. Seed with a hard bony shell, resting in a shallow cup-shaped fleshy aril.

Culture and Propagation.—Dacrydiums are beautiful Spruce-like trees with drooping branches, but unfortunately they attain only small dimensions in favourable parts of the British Islands, sheltered from bleak north and east winds. A light loamy soil with a little peat and leaf soil suits them very well. They may be increased by cuttings of the partially or wholly ripened shoots in summer and autumn inserted in sandy soil under glass. The following are the only species that seem to flourish out of doors in the British Islands:—

D. cupressinum.—A beautiful pyramidal tree about 16 ft. high in cultivation, but 60–100 ft. in its native state in New Zealand. It has weeping branches and small closely imbricated pale green leaves.

Culture &c. as above. This is often grown in cool greenhouses and conservatories, but will flourish near south walls in favoured parts of the country.

D. elatum.—A tall tree 60 ft. high in its native country Palo Penang, with crowded erect or spreading spiny-pointed leaves. A very slow-growing species.

Culture &c. as above.

D. Franklini (*Huon Pine*).—A famous Tasmanian Conifer, about 100 ft. high, with short spreading branches and slender drooping branchlets covered with scale-like imbricated leaves.

Culture &c. as above. Small plants 8–10 ft. high are to be found here and there in favoured spots in the British Islands.

Tribe IV.—PODOCARPUS TRIBE (*Podocarpeæ*).—Tall evergreen trees with flat linear or nearly ovate-elliptic leaves, and diœcious or more often monœcious flowers on different twigs.

SAXEGOTHEA (PRINCE ALBERT'S YEW).—A genus containing only one species:—

S. conspicua.—A handsome Yew-like Conifer, native of S. Chili and Patagonia, where it attains a height of 30 ft., with a beautiful loose and drooping habit, and leathery stiff linear or oblong lance-shaped leaves ½–1½ in. long, shortly stalked and sharply pointed. Flowers monœcious; the male flowers are borne in terminal spikes or racemes, the female ones in roundish cone-like heads on long slender, sometimes drooping stalks. Fruit composed of several consolidated scales formed into a fleshy cone.

Culture and Propagation.—This tree is probably hardier than is generally supposed. It is very rarely seen, but it should flourish fairly well in sandy loam in warm sheltered and mild localities, at least in England and Ireland and the west coast of Scotland. Flowers and fruits have not yet been produced in the British Islands so far as I am aware, but failing imported seeds, cuttings of the ripened shoots will root in sandy soil under glass during August and September.

PRUMNOPITYS (PLUM FIR).—This genus is sunk under *Podocarpus* in the 'Genera Plantarum,' but is retained by Dr. Masters and other authorities. It consists of the following species only:—

P. elegans (*Podocarpus andina; Stachycarpus andina*).—A beautiful Conifer 50–65 ft. high in its wild state on the Chilian Andes. The trunk is well furnished with brown-barked branches, the lower ones drooping and often sweeping the ground. Leaves more or less in 2 rows, linear, flattened, ½–1 in. long, deep green above, slightly glaucous and channelled beneath. Fruit about the size and shape of a white Grape containing a hard bony seed surrounded by a soft fleshy pulp, which has an agreeable flavour when ripe, and is said to be edible.

Culture and Propagation. — This species reaches a height of 10–20 feet in the British Islands, and seems to be hardy in widely different parts. It enjoys light sandy loam with a little peat and leaf soil, and makes a fine ornamental tree. It may be increased by cuttings, or imported seeds, in the same way as Prince Albert's Yew (*Saxegothea*).

Tribe V.—ARAUCARIA TRIBE (*Araucarieæ*).—Large trees with broad or narrow spirally arranged leaves and diœcious or monœcious flowers. Cones roundish with numerous spirally arranged scales, each having 1–6 inverted winged or wingless seeds.

CUNNINGHAMIA (BROAD-LEAVED CHINA FIR).—A genus with only one species:—

C. sinensis (*C. lanceolata; Pinus lanceolata*).—A remarkable Chinese tree with a straight cylindrical trunk which reaches a height of 40–50 ft. in a native state, but much less in cultivation. The branches are mostly in whorls spreading horizontally, and the leaves, which are about 1½ in. long, are lance-shaped, much pointed, stiff, flat, entire, with a roughish margin. Flowers monœcious; male ones in grouped catkins about 1 in. long; females with 3 ovules. Cones round or ovoid, woody. Bracts long, leafy, spreading at the points. Seeds winged, drooping. Seed-leaves 2. The variety *glauca* is distinguished by its glaucous foliage.

Culture and Propagation.—Cunninghamias are too tender for most parts of the British Islands, but in the mildest and most sheltered parts of the south of England and Ireland plants should grow well in light sandy loam with a little peat and leaf soil added. Seeds are the best and surest way to secure new plants, but cuttings of the ripened wood will also root in sandy soil under glass, although a fair percentage will probably fail.

ARAUCARIA.—A genus of tall trees with spirally arranged scale-like leaves, and diœcious or monœcious flowers; male flowers in spikes. Cones roundish or ovoid, with numerous spiral deciduous scales. Seeds more or less winged, and each more or less united with a scale.

A. imbricata (*A. chilensis*).—*Monkey Puzzle; Chili Pine.*—A well-known prickly leaved Conifer native of S. Chili, where it forms a noble tree 150 ft. high, and is never found more than 2000 ft. below the snowline. The branches radiate in whorls from the main trunk, the lower ones more or less drooping and ascending at the ends, the upper ones more or less ascending, all producing two rows of drooping branchlets thickly covered with deep shining green, ovate lance-shaped strong prickly pointed leaves spirally arranged. The large globular cones, 4–6 inches in diameter, are usually borne separately on the trees but occasionally with the male flowers also, so that the species must be regarded both as monœcious (male and female flowers on the same tree) and diœcious (on distinct and separate trees).

Out of 8 or 10 species known this is the only one generally grown out of doors in the British Islands, although *A. Cunninghami*, a handsome species from Moreton Bay, is said to be quite hardy on the S.W. coast of England.

There are many fine specimens of the Chili Pine in the British Islands ranging between 30 and 50 ft. high, but the largest and finest plant in the kingdom is that at Dropmore gardens, near Maidenhead. It is a male tree now 70 years of age, and 70 ft. or more high, with abundant and vigorous growth, and very healthy branches sweeping the ground, the diameter of the whole being about 40 ft. The plant enjoys a good depth of soil and perfect drainage with fairly moist surroundings and plenty of shelter from other tall trees. It is occasionally mulched or top-dressed with a little clayey loam.

Culture and Propagation.—It must be admitted that for one fine specimen there are many miserable-looking ones in all parts of the kingdom, chiefly in bleak exposed spots where they lose their lower branches on the exposed side, and this gives them a straggling and lop-sided appearance the reverse of graceful. Sheltered warm situations may therefore be taken as conditions essential for the development of symmetrical specimens of the Chili Pine. Plants are best obtained from seeds, which should be sown in sandy soil in cold frames as soon as ripe. When the seedlings are about 18 months or two years old they may be safely planted out, having been pricked out in the meantime, to make sturdier growth.

SCIADOPITYS (Umbrella or Parasol Pine).—A genus with only one species:—

S. verticillata.—A beautiful and very distinct Japanese Conifer, having a pyramidal habit and horizontally spreading branches, and attaining a height of 100 to 150 ft. in its native habitats. In the British Islands, however, it only reaches a height of 10–25 ft., but is nevertheless very graceful, although slow growing. The branches are alternate or in whorls from the main upright stem, and bear flat linear blunt deep evergreen stalkless leaves (or 'cladodes') 4–6 in. long, 20–30 or more in a whorl radiating upwards like the ribs of an umbrella, hence the popular name. Cones elliptic or cylindrical, 3–4 in. long, composed of united bracts and scales, each of the latter having 7–9 winged seeds. Seed leaves 2, leafy.

Culture and Propagation.—The Umbrella Pine thrives in rich moist loamy soil and will stand a fair amount of frost without injury, especially in warm and sheltered localities unaffected by the bitter winds from the north and east.

It is very rarely that ripe seeds are

produced in the British Islands. The plant must therefore be increased by imported seeds, or by cuttings of the half-ripened shoots inserted in summer in sandy soil with a little bottom heat, or even in cold frames or under hand-lights.

There is a so-called variegated form in which some of the leaves are of a more yellow-green than in the type.

Tribe VI. — Abietineæ (Pines, Cedars, Spruces, Larches, and Firs).—Trees with evergreen or rarely deciduous linear leaves spirally arranged, but apparently in 2 or more rows, or in tufts. Flowers monœcious. Cones mostly woody with spirally arranged imbricating scales, each having 2 winged inverted seeds.

PINUS (Pine Tree).—A large genus of evergreen trees having needle-like leaves in tufts or clusters of 2, 3, or 5. Flowers monœcious, male ones in catkins in dense masses, the female ones solitary or in whorls at the ends of the branches. Cones woody, ripening the second year, usually sessile, solitary or in clusters, slightly erect, horizontal, or drooping. Seeds oval with a hardy bony shell, with or without large wings. Seed-leaves variable in number, 3-sided.

Culture and Propagation.—The Pines constitute the largest genus in the Conifer family and exhibit a good deal of variety in habit, height, and beauty. Most of them are hardy in the British Islands, and there is scarcely a spot where at least some one species will not flourish. Generally speaking Pine trees flourish in rich loamy soil, but many thrive also in poor sandy soil, and others prefer a moist spot. They are usually increased by seeds sown in prepared beds in March and April, and more or less lightly covered with fine soil according to the size of the seed. By sowing the seeds 6 in. or so apart in rows the seedlings need not be disturbed for a couple of years and will make good growth; but if sown thickly they require to be transplanted the next season, or else thinned out. Choice and variegated kinds of which seeds cannot be obtained are increased by grafting on stocks of their own species. The amateur will find it better to obtain strong sturdy Pines from a nurseryman than attempt to raise them himself, unless he has a large garden or plantation, and can afford to wait until his seedlings become large enough for the purpose he has in view.

The following is a list of Pines most usually met with in gardens, although some others are naturally to be found in the Pinetum at Kew:—

P. Ayacahuite (*P. strobiliformis &c.*). A large and handsome Pine, native of Mexico and Guatemala, where it attains a height of 100 ft. or more, at elevations of 7000-11,000 ft. The slender 3-sided leaves are 6-7 in. long, and the slender cylindrical tapering cones about 9 in. long and 2 in. in diameter, drooping when fully grown and having broad ovate imbricating wrinkled scales with a blunt recurved point.

Culture &c. as above. This rare species is safer grown in warm and sheltered localities, and is probably not hardy enough north of the Tweed.

P. banksiana (*P. hudsonica*).—*Scrub Pine.*—A pretty and very hardy tree, 20-70 ft. high, native of the N.E. United States and the eastern slopes of the Rocky Mountains, usually found growing in barren sandy soil, but occasionally in rich loam. It has stiffish divergent leaves about 1 in. long, and cones about 2 in. long, usually curved, erect, or patulous, with pointless scales, which remain closed often for many years.

Culture &c. as above.

P. bungeana (*P. excorticata*).—*White bark* or *Lace-bark Pine.*—A distinct Pine, native of N. China, with long slender glaucous-grey branches, covered with smooth bark which ultimately peels off in flakes or flat patches as in the Birch or Plane. The young shoots are bluish-green and the bright green stiffish leaves are 3-4 in. long and somewhat 3-angled. The bluntly ovoid cones are 2-3 in. long, the scales having a transverse ridge at the top, from the centre of which a small hooked prickle juts out.

Culture &c. as above. This species is quite hardy. Cultivated specimens are from 10 to 20 ft. high.

P. Cembra (*Swiss Stone Pine*).—A beautiful symmetrical Pine 50-150 ft. high, native of the Alps and Carpathian Mountains, having 3-sided and 3-angled slender flexible leaves 2-5 in. long, marked with silver lines, and ovoid erect cones 3-4 in. long, the smooth scales of which end in a broad blunt spine. This is a very slow-growing plant and most of the larger specimens in the country are between 30 and 40 ft. high. At Linton Park, Maidstone, however, there is a specimen nearly 40 years old, and 70 ft. or more high, while at Howick Hall, Lesbury, the seat of Earl Grey, a specimen about 50 years old is more than 20 ft. shorter, and at one time was not in a thriving condition. The seeds do not sprout until the second spring. There are several varieties, the most notable being *pumila*, a dwarf stunted bush, 3–4 ft. high with shorter leaves and cones than those of the type; *aurea* has yellowish foliage.

Culture &c. as above.

P. contorta (*P. Bolanderi; P. Boursieri*). — This distinct species is found wild from Alaska to California on sandy dunes and exposed rocky points, forming a small stunted tree 20–30 ft. high with a trunk 1-2 ft. in diameter. It has bright green leaves 1–2 in. long, and ovoid or almost round cones about 1½ in. long, the branches being much twisted and gnarled; hence the specific name. The variety *murrayana* makes a much taller and straighter tree.

Culture &c. as above.

P. Coulteri (*P. macrocarpa*).—A handsome and distinct Californian Pine, growing 80-150 ft. high in a wild state, but not more than half that height in the British Islands. It has spreading branches, ascending at the tips, and beautiful glaucous stiffish triangular leaves 9-12 in. long. Cones yellowish-brown, about 12 in. long and 6 in. in diameter, weighing 4–5 lbs., and having very thick woody scales with a strong hooked spine.

Culture &c. as above. There is a fine specimen of this tree on the lawn at Kew. It is 60 ft. or more high, and has a graceful pyramidal habit.

P. excelsa (*Bhotan Pine; Weeping Fir*).—A beautiful Pine tree native of the Himalayas, where it grows at elevations ranging from 5000 to 12,000 ft. and attains a height of 90-100 ft. It is of fairly rapid growth in the British Islands, forming a straight slender trunk with branches regularly radiating, the upper ones ascending, the lower ones decumbent. Leaves very slender and flexible, drooping like tassels, three-sided, and of a beautiful glaucous-green—characters which readily distinguish it. The cones are cylindrical, drooping, slightly curved, 6–8 in. long, with large wedge-shaped loosely imbricating scales.

Culture and Propagation. — This ornamental tree is best in warm and sheltered localities, as it does not thrive in cold damp soils, nor does it stand bleak winds well. At Studley Royal, Yorkshire, the seat of the Marquis of Ripon, there is a good specimen about 70 years old and now probably 80 ft. high with a girth of more than 6 ft. breast-high. There are also fine specimens at Dropmore, near Maidenhead.

P. halepensis (*Jerusalem Pine*).—An interesting and distinct species, native of the Mediterranean region and the Levant. It has a loose meagre habit, ashy-grey branches, and scanty tufts of erect grey-green leaves 2–3 in. long. The drooping oblong-conical cones are 2½–3 in. long.

Culture &c. as above. This is supposed to be the Pine or Fir tree referred to in the Scriptures. It is not particularly ornamental.

P. insignis (*P. californica; P. radiata; P. tuberculata*).—*Monterey Pine.* A remarkably handsome Californian Pine 80-100 ft. high, distinguished by its bright green and strongly serrulate twisted leaves, 4–6 in. long, and glossy orange-brown cones, 4–5 in. long, having smooth spineless scales.

Culture and Propagation.—This Pine is usually considered fit for planting only in mild southern parts, but there is plenty of evidence to prove that it thrives in all parts of Great Britain and Ireland, usually having a more or less southern or western aspect in light loamy soil. There are fine specimens at Dropmore, Bucks, the largest being 60 years old and approaching 100 ft. high. At Carclew, Cornwall, is a specimen over 80 ft. high, while other fine specimens in England are to be found at Linton Park, Maidstone; Boconnoc and Scorrier, Cornwall; and Revesby Abbey, Lincolnshire, the dwarfest being nearly 60 ft. high and the tallest well over 70 ft.

In Scotland, as might be expected, *P. insignis* does not attain such a great height, but there are fine specimens, ranging between 40 and 50 years of age and between 50 and 60 ft. high, at such gardens as Cullen House, Banffshire; the

Marquis of Bute's; Keir House and Dunblane, Perthshire; and Castle Kennedy, Wigtonshire.

Ireland has almost as fine specimens as England, that at Lord Powerscourt's gardens, Wicklow, being the finest. It is 40 years old and not far short of 90 ft. high—probably the quickest grown tree in the kingdom. It is followed by one 34 years old at Kylemore Castle, Galway, which is over 60 ft. high. Other fine specimens in Ireland are to be found at Woodstock, Kilkenny (80 ft.); Killarney House (70 ft.); Adare Manor, Limerick (75 ft.); Waterstown, Westmeath (65 ft.); and Coollattin, Wicklow (60 ft.).

P. Jeffreyi (*P. deflexa*).—A fine Californian tree, 90–100 ft. high, growing naturally on dry gravelly slopes. It has a rather loose and open habit, and bears glaucous-green leaves 7–8 in. long with one convex and two concave sides. The more or less drooping cones are about 7 in. long and 3 in. in diameter, oblong cylindric, brownish in colour, the scales having a triangular hooked point. There is a fine specimen at Revesby Abbey, Boston, Lincolnshire, about 45 years old and over 50 ft. high.

Culture &c. as above. In cultivation this Pine grows best in a rich sandy loam, with a west or south aspect.

P. koraiensis.—An elegant, compact-growing tree, 30–40 ft. high, native of Corea, but rarely found in a wild state in China and Japan. It has ascending branches and slender 3-sided rough-edged leaves 3–4 in. long, bright glossy green on the outer and broader side and silvery white on the two inner sides. There are many forms of this species not yet well known in cultivation.

Culture &c. as above, p. 990.

P. lambertiana (*Sugar Pine*).—An elegant Californian Pine, attaining the great height of 150–300 ft. in its wild state, with a trunk 10-22 ft. in diameter. The largest specimens in the British Islands are not more than 60 ft. high. The leaves are 3-sided, 4–5 in. long, rough-edged, slightly twisted, bluish or glaucous green in colour, and clustered towards the ends of the drooping branches. The cylindrical, tapering, and drooping cones are 15-20 in. long, 3-4 inches in diameter when ripe, and composed of large loosely imbricated scales, which protect large edible nutty-flavoured seeds.

Culture &c. as above, p. 990.

P. Laricio (*Corsican Pine*).—An ornamental and valuable tree, native of S. Europe, particularly Corsica, Sardinia, and Sicily, and very common on Mount Etna at an elevation of 4000–6000 ft. It is recognised by its tall straight trunk, 100–150 ft. high in a native state, and by its beautiful twisted glaucous leaves about 6 in. long. Cones pale brown, 2–3 in. long, the scales having a very short point. At Boconnoc gardens, Cornwall, there is a specimen about 50 years old and 80 ft. high; at Riccarton Castle, Midlothian, is a fine tree over 70 ft. high; and there is also a grand specimen at Kew, near the main entrance, with a naked trunk and a fine head.

There are several varieties of the Corsican Pine, but that named the Austrian or Black Pine (*P. Laricio nigricans* or *P. austriaca*) is best known and most valued for its ornamental appearance, dark green glossy shaggy leaves and reddish-brown cones. It grows as tall as the Corsican Pine, and either as a single specimen or in clumps or masses makes a highly attractive woodland tree. There are other varieties less well known, such as *karamana*, from Asia Minor, with pale brown bark and tufts of dark green leaves 6–8 in. long and ovoid conical cones about 4 in. long; *pallasiana* (or *taurica*), from the Crimea, with stiff leaves and cones larger than those of the Austrian Pine; *pygmæa*, a dwarf, dense bush; and many others such as *aureo-variegata*, *pendula*, *pumila*, *variegata* &c.

Culture &c. as above, p. 990.

P. montana (*P. carpatica; P. Mugho* (or *Mughus*); *P. Pumilio; P. uncinata*). A densely branched tree or shrub, 15–35 ft. high in cultivation, native of the Central European mountains and the Pyrenees, having the upper branches ascending or erect and the lower ones usually decumbent. Leaves about 2 in. long, dark green, crowded, stiff, and twisted. Cones usually in pairs, ovoid, woody, about 1½ in. long, the scales having a strong curved spine. The variety *nana*, known as the 'Knee Pine,' grows only about 2 ft. high, and is useful for knolls, banks, rockeries &c. According to Prof. Hansen, many millions of *P. montana* have been planted in Jutland in the poorest soil.

Culture &c. as above.

P. Montezumæ (*P. devoniana; P. occidentalis; P. nitida* &c.).—A Mexican Pine, attaining a height of 40 ft. or more in a wild state, with rather stout twisted drooping branches, stoutish stiff 3-sided leaves 8–4 in. long, and cones 4–5 in. long, 3 or 4 together, but often single and nearly horizontal.

This tree seems to be too tender for northern parts of the country. In Mr. Rashleigh's famous garden at Menabilly, Cornwall, there are some good specimens.

Culture &c. as above.

P. monticola.—A handsome pyramidal tree, native of the mountains of California and British Columbia at elevations between 3000 and 10,000 ft., where it attains a height of 100–150 ft. with a trunk 3–5 ft. in diameter. The branches are in whorls, and the 3-sided leaves are about 3 in. long, glaucous, with slightly roughish edges. Cones 5–6 in. long, tapering to a sharp point, and of a beautiful orange colour.

This species is closely related to the Weymouth Pine (*P. Strobus*), but is rather more handsome in appearance, with darker, stiffer, and richer green foliage, which, with the conspicuous cones, make it a distinct and beautiful landscape tree.

There are several fine specimens in various parts of the kingdom, that at the Palace gardens, Scone, Perth, the seat of the Earl of Mansfield, being one of the best. It is under 50 years of age and about 75 ft. high.

Culture &c. as above.

P. muricata (*P. edgqriana*).—A distinct Californian Pine, 25–50 ft. high, having an unusual and irregular appearance and bright green flexible leaves 3–5 in. long, convex on one surface and concave on the other. Cones about 3 in. long, very dense and woody, in clusters, with prominent scales furnished with a sharp woody point.

Culture &c. as above. This species is not particular as to soil, and makes a valuable game shelter, or is effective on the landscape in high and windy situations.

P. oocarpa (*P. oocarpoides; P. Skinneri*).—A rather rare species, native of Mexico and Guatemala, and too tender for any except the mildest and most sheltered spots in the south of England and Ireland. In Mr. Rashleigh's garden there is a specimen which a few years ago was 21 ft. high and covered an area of 79 ft. in circumference with its irregular drooping branches, some of which rested on the ground. It has borne cones and male flowers at the same time.

Culture &c. as above.

P. parviflora.—A distinct and handsome Japanese Pine, 25–40 ft. high in a wild state, but so far only about half that height in cultivation. Its trunk is well furnished with close horizontal or slightly ascending branches, and the stiff, crowded, slightly twisted leaves are 1–2 in. long, silvery on the flattened or inner side and green on the other.

This species is not yet well known in cultivation, although there are specimens in Mr. Rashleigh's garden in Cornwall.

Culture &c. as above.

P. Peuke.—An interesting Macedonian Pine, at one time thought to be identical with the Himalayan *P. excelsa*, to which it bears some resemblance. It grows in granitic soil and varies in height from a tortuous bush of 4 ft. at the highest elevations to a tree about 50 ft. at the lowest. The slender needle-like leaves are 2½–3 in. long, and the oblong elliptic cones are about 4½ in. long, with broad roundish scales.

Culture &c. as above.

P. Pinaster (*P. maritima*).—*Maritime* or *Cluster Pine.*—A beautiful and variable Pine tree, native of the Mediterranean shores and particularly abundant in Portugal, Spain, the west and south of France, where it attains a height of 60–80 ft. It has dark green broad stoutish leaves 6–12 in. long, and yellowish-brown cones about 4 in. long, produced in dense clusters and composed of pyramidal angular scales with a short straight prickle.

The variety *Hamiltoni*, known as Lord Aberdeen's Pine, is an elegant tree having shorter and paler green leaves than the type; and the variety *variegata* has the foliage more or less variegated with green and yellow. There is also a variety called *lemoniana*, in which the usually lateral and deflexed cones assume an erect position.

Culture and Propagation.—The Cluster Pine has received a very bad reputation, especially in Scotland, and hence it is very rarely met with. It is said to be a difficult Conifer to transplant, on account of its long bare roots, and the best plants are those from seeds which have been sown in permanent positions in deep dry sandy soil. Seedlings should never be allowed to go more than one year before transplanting. There are a few good specimens here and there, that at Hewell Grange, Warwickshire, the seat of Lord Windsor, being probably the finest. It is a grand tree, nearly 90 years old and 70 ft. or more high. Other good specimens are at Woodstock, Kilkenny, and at the Earl of Aberdeen's, Haddo House, N.B.

P. Pinea (*P. maderensis*).—*Parasol* or *Stone Pine.*—A native of both sides of the Mediterranean, attaining a height of 50-60 ft. in Greece, where its seeds form an extensive article of commerce. It is a picturesque Pine, with spreading branches and branchlets chiefly confined to the top, giving the appearance of a huge umbrella. The deep green stiffish leaves are half cylindrical, about 6 in. long, with slightly rough edges. The cones are 4-6 in. long and about 3 in. in diameter, composed of stout hard woody scales ending in a recurved bluntish prickle.

Culture and Propagation.—The Stone Pine is rather slow in growth, and, moreover, somewhat tender, so that it should be planted only in warm localities, sheltered or screened by hardier trees from bleak winds.

P. ponderosa (*P. benthamiana; P. brachyptera; P. Beardsleyi; P. parryana; P. sinclairiana*).—A gigantic Pine, native of California, where it reaches a height of 200-300 ft. with a trunk 12-15 ft. in diameter, but much smaller in some localities. It has thick horizontally spreading branches in distant whorls, and flexible, sometimes twisted, more or less glaucous leaves 8-12 in. long, 3-angled and flattish. Cones ovoid, 3-6 in. long, with scales ending in a short spine. There are many good specimens in the British Islands, that at Linton Park, Maidstone, about 45 years old and 65 ft. high, being one of the best; it has a bare stem for 20 ft. up.

Culture &c. as above, p. 990.

P. pyrenaica (*P. Brutia; P. carica; P. paroliniana*).—*Calabrian Pine.*—A handsome, quick-growing tree with a pyramidal outline, native of the Pyrenees, where it grows 60-80 ft. high. It has numerous close-set branches and thin smooth leaves about 4 in. long. Cones about 2½ in. long, slightly curved and tapering to a point and borne in dense clusters. It grows 30-40 ft. high in the British Islands.

Culture &c. as above, p. 990.

P. sabiniana (*Nut Pine*).—A native of the Californian Sierras at an elevation of 4000 ft., forming a large tree 80-100 ft. high with a trunk 2-4 ft. in diameter. It has a loose, widely branching habit and thin flexible glaucous-blue slightly twisted leaves, rounded on the outer, prominently ribbed on the inner side, and 8-12 in. long, drooping in handsome loose curved tassels. The cones are 5-8 in. long, and almost as thick, and of a rich chocolate-brown colour, protected by the strong recurved hooks of the scales. The Indians prize the seeds highly as an article of food, but they have to roast the cones before the bracts or scales will open sufficiently to allow the hard-shelled seeds to fall out.

Culture and Propagation.—The Nut Pine flourishes in sandy loam, and should be grown in warm sheltered spots. It makes an excellent lawn tree owing to its pyramidal habit and drooping tassels of glaucous leaves. Some of the best specimens in cultivation are only about half the height recorded for wild trees.

P. Strobus (*Weymouth Pine*).—A fine North American tree, 80-170 ft. high in a wild state, with a trunk 4-12 ft. in diameter. It has soft slender leaves 3-5 in. long, pale green, striped with silver. The cones are 6-8 in. long, cylindrical, tapering, slightly curved, with smooth scales thickened at the apex. The variety *nana* is a small, compact, bushy shrub with short slender branches and leaves. *Alba, argentea*, or *nivea* has more or less erect spreading leaves, deep green when fully developed, but of a beautiful silvery white when young. Other varieties are known as *compacta, densa, fastigiata* and *prostrata*, all names referring to peculiarity in habit of growth.

The Weymouth Pine is not only valuable as an ornamental tree, but of late years it has been regarded as one of the finest of timber-producing trees. It derives its popular name from the fact that it was extensively planted, soon after it was first introduced in 1705, by Lord

Weymouth on his Longleat estate in Wiltshire. There are many fine specimens in the kingdom, among which may be mentioned those on the Logie Almond estate, Scone, Perthshire, some of which are over 90 ft. high.

Culture &c. as above, p. 990.

P. sylvestris (*Scots Fir*).—A beautiful and picturesque native Pine, 50–100 ft. high, with rough rusty-red bark and dense heads of glaucous green leaves 1½–8 in. long. Cones 1-2 in. long, 1–8 together, tapering towards the top, having raised and ridged scales with a square or triquetrous outline and a small shield with a deciduous point. There are many more or less distinct varieties of the Scots Fir, among which may be mentioned *argentea*, with cones and leaves of a silvery hue, and *fastigiata*, with an erect Lombardy Poplar habit. Other forms are *aurea*, *globosa*, *nana*, *pumila* and *variegata*.

Culture &c. as above. The Scots Fir as a rule grows best in peat and loam; and there are few more picturesque sights on the landscape than a group with tall naked trunks and spreading heads, especially when the bark is played upon with bright sunshine and deep shadow.

CEDRUS (CEDAR TREE).—A genus of tall, elegant, evergreen trees, with stiff needle-shaped leaves, scattered or in tufts. Flowers monœcious, the male catkins solitary, cylindrical, and terminal, the female somewhat oval and blunt, solitary, very rarely 2 together, erect. Cones ovoid, blunt at the ends, quite smooth, erect, with overlapping, more or less deciduous scales, each having 2 seeds with large membranous wings. Seed leaves 8–9.

Culture and Propagation. — The Cedars are well-known ornamental trees that flourish in ordinary good soil, preferring a rich loam or sandy clay. In parks, pleasure grounds, and large gardens they have a pleasing and picturesque effect, large trees of the Lebanon Cedar looking particularly majestic. The kinds described below, although quite distinct enough for garden purposes, have doubtless been obtained from the same common stock, and there are numerous connecting forms which may be placed with either of the three types.

The Cedars are propagated by means of the seeds, which are with difficulty extracted from the cones. The latter do not fall from the trees, and may persist for several years; nor do their scales open spontaneously. When seeds are required, the cones, which are always on the upper sides of the branches, must be picked. The seeds are best sown as soon as they are extracted from the cones, in April, in shallow pans or boxes, in rich sandy soil. Many of the choicer varieties may be veneer-grafted on stocks of their common form.

C. atlantica (*C. africana; Abies atlantica*).—*Atlas Cedar.*—A noble Conifer, native of the Atlas and other mountains in N. Africa, where it grows 80–100 ft. high, having a tabular or flattish head when old, but somewhat pyramidal and open when young. The leaves are shorter than those of the Cedar of Lebanon, and usually of a glaucous green or greyish silvery hue. The cones are similar to those of the Cedar of Lebanon, but are not produced until the tree attains a good age. There are many forms of the Atlas Cedar, those best known being *aurea*, *cinerescens*, *glauca*, *columnaris*, *fastigiata*, *pendula*, *pyramidalis*, and *variegata*—names which explain the characteristics of the variety they represent. At Mulgrave Castle, Yorkshire, the seat of the Marquis of Normanby, there is a very fine specimen, of uncertain age, about 70 ft. high.

Culture &c. as above.

C. Deodara (*C. indica; Abies Deodara; Larix Deodara; Pinus Deodara*). The *Deodar* or *Indian Cedar*.—A beautiful tree native of the western Himalayas, where it forms immense forests at elevations from 6500 to 13,000 ft., the finest trees, 150-200 ft. high, being always found on the northern side of barren mountains in thin poor soil formed from the decomposition of granite, gneiss, mica, or clay-slate. When young, the Deodar is easily recognised by its pyramidal habit and drooping feathery branches thickly clothed with glaucous-green linear 3-sided leaves, growing in bundles on the old wood, but scattered on the young shoots. There are several forms of this elegant and graceful tree, such as *argentea*, *aurea*, *compacta*, *crassifolia*, *Hügeli*, *robusta*, *uncinata*, *variegata*, *verticillata*, and *viridis*. The Deodar was not introduced to Britain until 1831, and its first cones, which are 4–5 in. long, were produced in 1858, at Bicton, Devonshire, the seat of the Hon. Mark

Rolle. One of the first plants raised from seed in England is now growing in Kew Gardens.

Culture &c. as above. The Deodar is now distributed throughout the whole of the United Kingdom, and although it sometimes suffers from severe frost and bleak winds, it may be regarded as perfectly hardy. It should, however, in northern parts be protected by screens of other trees from the north and east winds, and also from south-westerly gales which are apt to snap the tops off and thus mar the symmetry of the tree. At Studley Royal, Yorkshire, there is a fine specimen, 69 years old—doubtless one of the very first plants introduced—over 70 ft. high a few years ago, and having a spread of over 50 ft. There are several other fine specimens in the kingdom, but they are neither so old nor so tall as that at Studley Royal, although several have thicker trunks.

C. Libani (*C. patula; Abies, Pinus,* and *Larix Cedrus; Larix patula*).—*Cedar of Lebanon.*—A majestic tree, native of Mount Lebanon and Taurus in Syria, with a sturdy Oak-like habit and large flat horizontally spreading fan-like branches forming masses of short rigid leaves having a sombre appearance from below, but of a bright green seen from above. The cones, which are produced freely in the British Islands, are oblong ovoid, 3–4 in. long, at first purplish, but of a soft brown when ripe, and quite smooth. There are several forms of the Cedar of Lebanon, that known as *brevifolia,* with much shorter leaves than the type, being called the 'Cypress Cedar.' Other forms are *argentea* or *glauca, decidua, denudata, hybrida, pendula, pyramidata, nana, stricta &c.*

The first Cedar of Lebanon brought to Europe seems to have been by Belon, who introduced it to France in 1549. The date of its introduction to England is uncertain, but it does not appear to be until after 1664 when John Evelyn wrote his 'Silva,' and does not refer to it. Perhaps the very first tree introduced is a grand old specimen still flourishing at Bretby Park, Derbyshire, the seat of Earl Carnarvon. This notable tree was planted in the year 1676, and is thus 224 years old. It stands on a south sloping spot, about 360 ft. above sea level, in deep black loam of good quality, resting on sandy clay. It is over 80 ft. high, and has a girth breast-high of over 16 ft. The celebrated Chelsea Cedars are said to have been planted in 1683, and next to the Bretby Cedar are probably the oldest in England; one of the tallest Cedars is that at Methven Castle, Perthshire, which is over 90 ft. high. There are also famous trees at Hewell Grange, Worcestershire, over 100 years old; at the Duke of Buccleuch's gardens, Dalkeith, about 130 years old; at the Duke of Leinster's, Carton, Kildare; Woodstock, Kilkenny; Syon House, Isleworth, and Kew Gardens.

Culture &c. as above, p. 995.

PICEA (Spruce Fir).—The leading characteristics of the Spruce Firs are, according to Dr. Masters, the projecting cushions at the base of the leaves, which give a rough, pegged appearance to the shoots; the 4-sided leaves uniform in structure; the usually pendulous woody cones, ripening in the first year, and the scales of which do not fall away one from the other as in the Silver Firs. Bracts concealed, not projecting, free from the scales except at the base. Stamens in spike-like masses. Seeds small. Seed-leaves 8–10, 3-sided, toothed.

The genus Picea has been and still is much confused in gardens with the genus *Abies,* which is now confined to the Silver Firs. (See p. 1001.)

Culture and Propagation. — The Spruce Firs (*Piceas*) flourish in light loamy soil, and may be increased from seeds in the same way as the Pines. The seeds may be sown when ripe in cold frames and lightly covered with sandy soil. If not sown too thickly the young plants may remain in the seed-beds for a couple of years, but afterwards they will be better for transplanting in autumn. When well grown in favourable situations the Piceas are exceedingly beautiful and many of them make excellent lawn plants. Rare kinds or varieties may be increased by means of grafting on stocks of commoner varieties, but it will as a rule be more satisfactory if the amateur obtains healthy specimens from a nurseryman.

P. ajanensis (*Abies ajanensis*). — A beautiful Spruce Fir native of Eastern Siberia and Japan, where it grows 70–80 ft. high. It has smooth brownish shoots marked with oblong smooth prominent cushions, and having flattish linear oblong bluntish leaves, twisted at the base so as to be all on the same horizontal plane; upper surface 8-ribbed, lower 1-ribbed. Cones erect, 1–2 in. long, oblong, tapering at each end, and having shining brown oblong ovate scales. This tree grows 20–80 ft. high in Britain.

Culture &c. as above, p. 996.

P. alba (*Abies alba; A. cærulea; A. arctica &c.*).—*White Spruce.*—A native of Arctic N. America, where it forms a tree 50–170 ft. high with a trunk 2–8 ft. in diameter, and grows in low rather wet soil on the borders of ponds and swamps. The young shoots are very glaucous, and the erect 4-angled leaves are rather long-pointed, somewhat glaucous, and scattered round the branches. The cones are oblong cylindrical, light brown, small when ripe. The specimens in cultivation are still comparatively small—about 15–20 ft. high.

Culture &c. as above. Suitable for growing near rivers, lakes &c.

P. alcockiana (*P. bicolor; Abies alcockiana*).—A beautiful pyramidal tree, native of Japan, where it reaches a height of 90–120 ft. The young shoots are covered with long shaggy hairs, and the leaves are stiff, more or less curved, linear-oblong, and 4-sided, flattened at the apex. Cones more or less drooping, oblong, 2–8 in. long, tapering at each end. The tallest plants in cultivation at present are between 80–40 ft. high.

Culture &c. as above.

P. breweriana.—A beautiful Spruce, native of N. California, where it attains a height of about 90 ft. A striking characteristic of this species consists in its long drooping downy branches which make some of the trees resemble Weeping Willows. The leaves are flat linear and blunt, 1–1½ in. long, and the cones are about 8 in. long, narrowly cylindrical, tapering to the base. Very rare.

Culture &c. as above.

P. Engelmanni (*Abies Engelmanni; Pinus commutata*).—An elegant tree, native of the Rocky Mountains, where it forms a tree 80–150 ft. high, with a trunk 8–4 ft. in diameter, or at great elevations becomes a low prostrate shrub. It has stout stiff, slightly recurved, deep green, more or less 4-angled leaves, and cones 2–2½ in. long. The variety *glauca* is a beautiful plant with glaucous silvery foliage. Cultivated specimens of Engelmann's Spruce are as yet only about 20–80 ft. high.

Culture &c. as above, p. 996,

P. excelsa (*P. vulgaris; Abies excelsa; A. Picea; Pinus Abies; P. excelsa*).—This is the Common Norway Spruce or Burgundy Pitch tree, native of North Europe, especially Scandinavia, where it attains a height of 100–120 ft., making a beautiful tapering pyramidal tree. Its more or less decumbent branches are clothed with dense dark green 4-angled leaves, and it bears cylindrical drooping cones 5–7 in. long.

As many as 60 forms of this species have been mentioned, but the following are among the best for ornamental gardening purposes: *clanbrassiliana*, a dwarf dense slow-growing bush, rarely exceeding 4 ft. high; its sub-variety *stricta* has more erect branches. *Aurea* is a striking form with long curved glaucous-green leaves tipped with yellow; *pumila glauca* is a very dwarf spreading slow-growing but pretty variety; and *pygmæa* (or *nana*) grows about 1 ft. high, and is pyramidal in shape. The common form of the Spruce furnishes the well-known 'Christmas Tree.'

Culture &c. as above.

P. Glehni (*Abies Glehni*).—A dwarf dense-growing Spruce, native of Japan and the Island of Sachalin. It has crowded linear 4-angled sharply pointed leaves, about ½ in. long, and narrow cylindrical cones about 2 in. long, but they are very variable in size.

Culture &c. as above.

P. Morinda (*P. smithiana; Abies smithiana; A. Khutrow; Pinus Khutrow*). A beautiful tree increasing in gracefulness with age, native of the Himalayas from Bhotan to Cashmere at elevations between 8000 and 11,000 ft., and reaching a height of 80–120 ft. Its elegant drooping branches are densely clothed with rigid sharply pointed bright green 4-angled leaves, 1–2 in. long. The cones are ovoid-oblong, 4–6 in. long, with broad entire roundish leathery scales of a shining brown colour.

The Himalayan Spruce—as *P. Morinda* may be called—is an excellent tree for elevated parts of the country. There is a specimen over 80 ft. high at Carclew gardens, Cornwall, and another nearly 80 years of age at the Earl of Hopetoun's, West Lothian, which is about the same height, and one of the very first plants introduced to Britain.

Culture &c. as above, p. 996.

P. nigra (*P. rubra; Abies nigra; A. mariana; A. denticulata; Pinus nigra; P. rubra*).—*Black Spruce.*—This variable tree is probably more important for its economic properties than for its ornamental aspect. It grows 50–70 ft. high in North-Eastern America and Canada, in light dry rocky soils; or in cold wet swamps, where it forms only small stunted bushes or trees of little value. The foliage, consisting of 4-angled leaves about ½ in. long, is deep sombre green in colour, giving a black appearance to the tree—hence the popular name. The cylindrical cones are 1½–2 in. long, blackish-purple, with rounded wavy scales, crenulate or divided at the top. The variety *pumila* grows about 3–4 ft. high, and has a compact habit, and smaller leaves than the type. The variety *rubra* or Red Spruce is a dwarf form with redder bark and cones than the type.

Culture &c. as above.

P. Omorica (*Pinus Omorica*).—*Servian Spruce.*—A beautiful and distinct Spruce native of the mountains of Servia, having flattish, straight or curved linear oblong blunt leaves, ½–¾ in. long, shining green beneath, with a prominent midrib above. Cones like those of the Larch, about 2 in. long, ovoid-conic, produced in great profusion.

Culture &c. as above. Not yet very well known.

P. orientalis (*Abies orientalis; A. wittmanniana; Pinus orientalis*).—An ornamental but slow-growing Spruce, native of the Taurus and Caucasus Mts., characterised by its dense habit and masses of deep green somewhat 4-angled leaves, with cones rather cylindrical in shape, pointed at the apex, about 3 in. long. Other forms are *aurea* and *pygmæa*.

As an ornamental and perfectly hardly tree, *P. orientalis* is worth growing. It is useful for large lawns, parks, and pleasure grounds, in places where trees of a larger growth would be hardly suitable. There are some fine specimens in the country. That at Penrhyn Castle, Bangor, about 50 years old and over 60 ft. high, may be mentioned as a fine tree.

Culture &c. as above.

P. polita (*Abies polita; A. Torano*).—*Tiger-tail Spruce.*—A handsome species, native of the mountains of Corea and Japan, having a bold sturdy habit and distinct appearance. Its branches are densely covered with stiff, very sharply pointed 4-sided leaves, ½–¾ in. long. The elliptic tapering and drooping cones, 4–5 in. long, are borne at the ends of the branches, having shining brown leathery scales, the whole suggesting the idea of a tiger's tail to the Japanese. This species has not yet attained its full height in British gardens, the largest plants being 15–35 ft. high.

Culture &c. as above, p. 996.

P. pungens (*American Blue Spruce*). A beautiful Spruce native of the United States, where it attains a height of 120–160 ft. with a trunk 2–3 ft. in diameter, at elevations between 6000 and 9,000 ft., growing by the edges of streams in damp or wet soil. The tree has a rich orange-coloured bark and emits an aromatic fragrance. The slender narrow sharply pointed leaves are ½–1 in. long, and 4-sided. The oblong drooping cones, about 3 in. long, vary in colour from dark apple-green to a beautiful silvery hue as in the variety *argentea*, which is more beautiful even than the variety *glauca*, with charming glaucous foliage. This species has been a good deal confused in gardens with *P. Engelmanni*, and in many places plants of the latter are labelled *P. pungens*. It is a fast-growing hardy and ornamental tree, and does well in the neighbourhood of large towns—retaining its beautiful colour throughout the year, but being naturally more attractive when the young growths are developing in spring.

Culture &c. as above.

P. sitchensis (*Abies* and *Pinus Menziesi; A.* and *P. sitchensis*).—*Tide-land Spruce.*—A handsome Californian tree, 150–200 ft. high in a wild state, with a trunk 10–15 ft. in diameter, growing on gravelly ridges and swampy ground. Its regularly whorled stiffish branches are clothed with linear sharp-pointed incurved and twisted leaves, about 2 in. long, turning in every direction, and silvery white beneath. The cylindrical drooping cones are about 3 in. long, the scales having a dry shrivelled appearance and ragged edges.

There are many fine specimens in the kingdom, but that at Curraghmore, the seat of the Marquis of Waterford, is probably the finest. It is a grand tree, 65 years old, and is close on 120 ft. high. Other specimens worthy of mention are to be found at Penrhyn Castle, Carnarvon; Boconnoc and Carclew, Cornwall; Howick Hall, Northumberland; Haddo House, Aberdeen; Cullen House, Banff; Rhosdhu, Dumbartonshire; Kinnettles, Forfarshire; Dolphinton, Lanarkshire; Morton Hall and Oxenford Castle, Midlothian; Brodie Castle, Morayshire; Abercairnie, Castle Menzies, Cultoquhey, Keir House, Murthly Castle, Ochtertyre, Rossie Priory, Scone, The Cairnies, and Castle Leod in Perthshire; Buchanan Castle, in Stirlingshire; Shane's Castle, Antrim; Fota Island, Cork; Woodstock, Kilkenny; Abbey Leix, Queen's County; Markree Castle, Sligo; and Coollattin, Wicklow. Among which the shortest specimen is over 60 ft., and the tallest—that at Castle Menzies, Perth—about 100 ft. At most of these places it is known better as *Abies Menziesi* than as *Picea sitchensis*—the name under which it should now go.

Culture &c. as above, p. 996.

TSUGA (HEMLOCK SPRUCE).—A genus of evergreen trees having the ultimate branches slender and often drooping, and stalked, usually spreading more or less 2-ranked leaves arising from prominent cushions. Flowers monœcious; male flowers lateral, with stamens on stalked heads. Female catkins solitary, terminal, rounded. Cones drooping. Scales persistent, more or less woody. Seeds very small with obovate wings. Seed leaves 3-6.

Culture and Propagation.—The Tsugas may be increased and grown in the same way as the Pines and Piceas. Seeds may be sown when ripe in light sandy loam in cold frames, and when the seedlings are 2 or 3 years old they may be planted out in warm sheltered spots. Large plants have a very ornamental appearance, and, like most members of the Pine family, look better as isolated specimens than when mixed up with other trees in shrubberies.

T. brunoniana (*Abies* and *Pinus brunoniana; A.* and *P. dumosa*).—*Fragrant Fir.*—A native of the Eastern and Central Himalayas, where it forms a fine tree 70-80 feet high, with numerous slender drooping brittle branches. Leaves more or less in two rows, or scattered, flat, linear, blunt or slightly pointed, glossy green above, powdery white beneath. Cones solitary, sessile, about 1 in. long, at the ends of the branches.

Culture &c. as above.

T. canadensis (*Abies, Picea,* and *Pinus canadensis; Abies curvifolia*).—*Hemlock Spruce.*—A native of N.E. America, where it forms a tree 70-110 ft. high, with a trunk 3-4 ft. in diameter. It is found growing on dry rocky ridges, generally facing north, or less commonly on the borders of swamps in deep rich soil. It is readily recognised by its many long ascending feathery branches, divided into small twigs, each clothed with dark green flat leaves in 2 rows (more or less), and having 2 silvery stripes beneath. The small ovoid cones, about 1 in. long, droop from the tips of the branches. There are many varieties of the Hemlock Spruce having more or less descriptive names, such as *albo-spica, aurea, compacta, columnaris, globosa, gracilis, fastigiata, macrophylla, microphylla, nana, parvifolia, pendula, sparsifolia &c.*

One of the finest trees of the Hemlock Spruce in the kingdom is the grand old specimen at Studley Royal, Ripon, which is over 60 ft. high. A moist, deep, rich and light soil and situations sheltered from bleak blasts suit the Hemlock Spruce best. It is always handsome standing alone, so that it can fully develop and display its graceful form.

Culture &c. as above.

T. caroliniana.—A compact pyramidal tree 40-50 ft. high in a wild state on the dry rocky ridges of the mountains of Carolina at an elevation between 4000 and 5000 ft. It produces flattened sprays of branches and twigs covered with flattish linear leaves and drooping cones at the tips of the branches. This species is closely related to the Hemlock Spruce, from which it may be distinguished by its larger, glossier and blunter leaves, and larger cones with wide-spreading scales.

Culture &c. as above.

T. mertensiana (*Abies* and *Pinus mertensiana; Abies albertiana*).—*Prince Albert's Spruce.*—This graceful Conifer forms a large tree 100-200 ft. high, with a trunk 4-10 ft. in diameter, in the low moist bottoms and rocky ridges of Alaska, British Columbia and Oregon. It is recognised by its deep red-coloured bark and drooping branches with delicate feathery sprays of deep green foliage, silvered on the under surface, and particularly attractive in early summer, when every shoot ends in a tuft of golden-green leaves. It has cones similar to those of the Hemlock Spruce, but somewhat longer.

Culture &c. as above. It is an excellent tree for large lawns and parks sheltered from the north and east, and grown in a peaty loam. At Castle Menzies, Perth, there is a fine specimen about 47 years old, and not far short of 80 ft. high, which ripens seeds freely. At the Cairnies, Perth, there is also a vigorous tree about 40 years old, and about 65 ft. high.

T. pattoniana (*Abies* and *Pinus pattoniana; Abies Williamsoni*).—An ornamental alpine Conifer rarely 100 ft. high, with a trunk 5–7 ft. in diameter, in British Columbia and the mountains of Central California, where it grows at an elevation between 8000 and 10,000 ft. on dry slopes and ridges. It has a graceful habit, with slender downy twigs covered with rather sharp, angular, often curved, light green leaves ½–1 in. long, and produces cylindrical oblong cones 2–3 in. long.

The plant known as *T. hookeriana* is regarded by some as identical with *T. pattoniana*, but the two are probably distinct enough for garden purposes. In *T. hookeriana* the closely set linear leaves have a glaucous tint, while the ovoid cylindrical cones, 1–2 in. long, pass from dark purple when young to soft brown when ripe.

Culture &c. as above.

T. Sieboldi.—A beautiful and rare Japanese Conifer 80–100 ft. high in a wild state, where it grows in stony warm valleys. It produces irregularly spreading branches, drooping at the ends and divided into numerous slender recurved twigs, covered with 2 rows of flat, somewhat linear, blunt leaves, deep green above, with 2 glaucous white stripes beneath. There is a variety called *nana*.

Culture &c. as above.

PSEUDOTSUGA (DOUGLAS FIR). This genus contains only one species:—

P. Douglasi (*Abies, Picea, Pinus*, and *Tsuga Douglasi; Pinus* and *Pseudotsuga taxifolia*).—The Douglas Fir extends in a wild state from British Columbia to Colorado, Texas, and Mexico, and is found at all elevations from the sea level to 10,000 ft. on the mountain sides. According to locality it forms a large and magnificent tree 100–300 ft. high, with a trunk 3–12 ft. in diameter. It has a reddish-brown shining bark, and drooping and symmetrically disposed branches with flat linear spreading leaves 1–2 in. long, in 2 rows, bright glossy green above, and more or less glaucous beneath. The ovoid oblong cones are about 4 in. long, with broad rounded scales and conspicuous, projecting, deeply toothed bracts.

The Douglas Fir—as may be seen from the list of synonyms—has been like a shuttlecock in the hands of the botanists, and although it received its present name of *Pseudotsuga* from the French botanist M. Carrière in 1867, it is still far better known in British gardens as *Abies Douglasi*. As its botanical characters did not fit with those of any of the genera quoted in the synonyms, a new genus had to be created for its reception, and it is to be hoped it will rest there. It has the habit and foliage of the Silver Firs (*Abies*), and the male flowers resemble those of the Spruce Firs (*Picea*). The drooping cones ripen the first year, and have persistent scales. Seeds winged, with 5–7 three-sided seed-leaves when they have germinated.

Culture and Propagation. — The Douglas Fir, although perfectly hardy, will not thrive in exposed situations swept by bleak and violent winds. In warm and favourable situations it grows rapidly, and if not crowded with other trees will develop into a beautiful and symmetrical tree. The easiest and best way to increase the Douglas Fir is by means of seeds sown as soon as ripe in cold frames in rich sandy soil. The seeds should be sown thinly, and when the young plants are 1 or 2 years old they may be transplanted to a warm and sheltered border. At Dropmore gardens, Bucks, there is a magnificent specimen 70 years old and over 120 ft. high. Some years ago several of its branches were broken down by heavy snowstorms, but it still continues to make fine growths, although the leading shoot being now too high to obtain much shelter suffers somewhat from cold winds. The Dropmore tree is closely followed by one in Lord Annesley's gardens, which a few years ago was over 100 ft. high, and beautifully feathered down to the ground; and also by one at Powderham Castle, Exeter, the seat of the Earl of Devon, about 58 years old and over 106 ft. high.

In many parts of the country the Douglas Fir has received a bad reputation, and one often sees a miserable specimen which has been planted just in the most exposed positions. There is plenty of evidence, however, to show that when grown in sheltered places the Douglas Fir attains magnificent proportions in all parts of the British Islands, and particularly in Scotland. Grand specimens between 70 and 100 ft. high are to be found in the following gardens: Wales, at Golden Grove, Carmarthen; and Penrhyn, Carnarvon. In England, at Carclew, Cornwall; Orton Longueville, Hunts; Revesby Abbey, Lincs; Howick Hall, Northumberland; Hewell Grange, Worcester; and Mulgrave Castle, Yorks. In Scotland, at Haddo House, Aberdeen; Inverary Castle, and Poltallock, Argyll; Cullen House, Banff; Marquis of Bute's; Rossdhu, Dumbarton; Jardine Hall, and Whittinghame, Dumfries; Fordell, Fife; Kinnettles, Forfar; Durris, Kincardineshire; Dolphinton, Lanark; Dalkeith, and Oxenford Hall (var. *glauca*), Midlothian; Altyre and Brodie Castle, Morayshire; Abercairny, Castle Menzies, Cultoquhey, Dupplin Castle, Methven Castle, Murthly Castle, Ochtertyre, Rossie Priory, Scone, The Cairnies, Braham Castle, Castle Leod, and Conan House, in Perthshire; Buchanan Castle, Stirling; and Hopetoun, West Lothian. In Ireland, at Fota Island, Cork; Killarney House, Kerry; Carton, Kildare; Abbey Leix, Queen's Co.; Markree Castle, Sligo; Shanbally Castle, Tipperary; Waterstown, Westmeath; Courtown, Wexford; and Coollattin and Powerscourt, Wicklow.

There is great variation in the Douglas Fir when raised from seeds—the most easy way to increase it; hence it is not surprising to find several varieties more or less distinct. The following are among the best: *pendula*, with elegant drooping branches; *Standishi*, a remarkable form, with larger leaves than the type, being deep green above and quite silvery beneath; *taxifolia*, a small handsome tree, with horizontal branches and straight twigs covered with leaves much longer and of a deeper green than the type; *Stairi*, a distinct form which originated at Castle Kennedy, Wigtonshire, the seat of the Earl of Stair, and is almost white in spring, becoming greener in summer, and silvery tinted in autumn. It is dwarf in habit and suitable for lawns. There are other forms, such as *compacta*, *elegans*, *glauca*, *macrocarpa*, *monstrosa*, and *revoluta*.

ABIES (Silver Fir).—A genus of evergreen trees having whorled branches and narrow, flat, needle-shaped leaves, arranged in 2 rows, and leaving a circular scar on the branch when they fall. Flowers monœcious; male catkins scattered, axillary; female ones solitary. Cones erect, more or less cylindrical in shape, ripening the first year. Scales deciduous when ripe, leaving a central column. Seeds with a large wing, more or less wedge-shaped. Seed leaves 4-8, flat.

Culture and Propagation.—The Silver Firs have been a good deal confused with the Spruce Firs (*Picea*) and the Pines (*Pinus*) and also other genera, but the following names are those now most generally accepted. They require the same treatment and may be increased by means of seeds sown when ripe in the same way as the Pines and Piceas. They flourish in good loamy well-drained soil, and are very ornamental plants for the lawn, isolated specimens being as a rule more effective than groups.

A. amabilis (*Picea* and *Pinus grandis*). *Red Fir.*—A magnificent Conifer, native of British Columbia, Oregon &c., where it attains a height of 100-150 ft., with a trunk sometimes 4 ft. in diameter. It has stiffish shoots furrowed with elongated cushions densely covered with dark hairs, and having blunt linear leaves, dark green above, silvery white beneath. Cones cylindrical, about 6 in. long.

Culture &c. as above.

A. balsamea (*Picea* and *Pinus balsamea*).—*Balsam Fir.*—A slender-growing N. American tree 70–80 ft. in a native condition, or at high elevations reduced to a low prostrate shrub. The dark green leaves, about ¾ in. long, are silvery white beneath, and the narrow erect cylindrical cones, 4–5 in. long, are violet in colour. At Saltoun Hall, East Lothian, there was a fine and well-furnished specimen 68 ft. high, growing in deep rich soil in a well-sheltered spot, but it was swept away by a great flood in 1891. It was supposed to be one of the oldest trees in the kingdom, having been raised from seeds sown in 1697.

There are several varieties of the Balsam Fir, among which may be mentioned *argentea* and *variegata*, *cærulea*, *nana*, *prostrata*, *longifolia*, *hudsonica* &c.

Culture &c. as above.

A. brachyphylla. — A native of the Japanese mountains, where it reaches a height of 120 ft. Its branches radiate regularly from the slender erect trunk, and the slender shoots are covered with linear leaves ¾–1 in. long, spirally arranged, but apparently in 2 rows, bright green above, with 2 silvery stripes beneath. This species has been only about 80 years in cultivation, and has not yet attained its full proportions.

Culture &c. as above.

A. bracteata (*Abies* and *Pinus venusta*; *Picea* and *Pinus bracteata*).—This species, which has been described as the 'most beautiful of all the Firs,' is a native of the Santa Lucia mountains, California, at elevations between 8000 and 6000 ft., where it attains a height of 150–200 ft. with a trunk 3–4 inches in diameter. It is readily recognised by its distinct habit. The trunk tapers regularly upwards in a straight line, and is clothed from top to bottom with slender graceful branches, having flat linear leaves 2–3 in. long, bright glossy green above, glaucous beneath, and arranged in 2 rows. The singular cones are about 4 in. long, having the bracts developed into long linear stiffish spines about 2 in. long, and slightly curved inwards; when fully ripe they are covered with globules of thin transparent resin.

Culture &c. as above. This species grows best in warm sheltered localities and in peaty loam. At Boconnoc in Cornwall there is a specimen about 39 years old and over 50 ft. high.

A. cephalonica (*A. Apollinis*; *A. panachaica*; *A. Reginæ Amaliæ*; *Picea cephalonica*).—A beautiful and somewhat variable Conifer, native of the Greek mountains, having long slender branches clothed with dark green flattish awl-shaped leaves, having a silvery white under surface. The erect cylindrical cones 5–6 in. long change in colour from green when young to red and ultimately brown when fully ripe. At Powderham Castle, Exeter, there is a fine specimen about 80 ft. high.

Culture &c. as above.

A. concolor (*Picea* and *Pinus concolor*).—A handsome Californian Conifer 100–180 ft. high, with a trunk 4–5 ft. in diameter in its wild state, on moist slopes and cañons at elevations between 3000 and 9000 ft. The young branches have a yellowish bark, and are clothed with blunt linear flat glaucous-green leaves, distichously arranged in double rows, and 2–3 in. long. Cones bluntly cylindrical, 3–5 in. long.

Culture &c. as above. This species requires shelter from cold winds. At Linton Park, Maidstone, there is a grand tree about 40 years old and now probably 70 ft. high. The variety *violacea* is a very beautiful plant having glaucous-blue foliage, and rich plum-coloured cones, which are rather more tapering than in the type.

A. firma (*A. holophylla*; *Pinus firma*). A beautiful straight-growing tree, native of Japan, where it reaches a height of about 100 ft. It has stiff leathery leaves 1–1½ in. long, spirally arranged, but apparently in 2 rows. The blunt cylindrical cones are 3–6 in. long, with imbricating scales and protruding keeled bracts. This is a rather variable species, and the plant known as *A. bifida* represents the young unfruiting stage, in which the leaves are of a different form from those on the older and on the cone-bearing branches.

At Carclew, Cornwall, there is a fine specimen of *A. firma*, which a few years ago was 45 ft. high.

Culture &c. as above.

A. Fraseri (*Picea* and *Pinus Fraseri*). A more or less desirable tree, native of the mountains of Carolina and Pennsylvania, where it forms large forests at an elevation of 5000–6000 ft., and reaches a height of 60–80 ft., with a trunk sometimes 2 ft. in diameter. It has green linear leaves about ½ in. long, silvery beneath and oblong elliptic cones 2½–3 in. long, with purplish scales and projecting golden-brown bracts. The wing of the seed is also purplish in colour. When not in fruit *A. Fraseri* very much resembles *A. balsamea*, the Balsam Fir, and it has been stated that seeds of the latter have been of late years distributed as those of *A. Fraseri*. At Powderham Castle, Exeter, there is a specimen of *A. Fraseri* which a few years ago was 72 ft. high.

Culture &c. as above.

A. grandis (*Picea* and *Pinus grandis*). A magnificent Californian tree 200–300 ft. high in its native habitat, growing in low moist situations, and often having a trunk 3–5 ft. in diameter. It is said to be the most rapid growing of all the Silver Firs, and has a symmetrical habit, a densely branched stem, and masses of soft rich green leaves ¾–1 in. long, silvery white beneath, and arranged in double rows on each side of the shoots. The blunt cylindrical cones are 4–5 in. long, and 2 in. wide, apple-green when young, ripening to bronzy-green, with very short ovate tapering and irregularly toothed bracts.

Culture &c. as above. *A. grandis* as a rule flourishes in rich well-drained loam, where it will always have sufficient but not excessive moisture, and shelter from cold winds. At Riccarton, Midlothian, there is a very vigorous specimen which in five years grew as much as 23 ft., and is now about 90 ft. or more high. There is also a fine tree at Poltalloch, Lochgilphead, Argyllshire, and in several other gardens.

A. lowiana (*Picea lowiana*).—*Low's Silver Fir.*—A very ornamental Conifer native of N. California, Oregon &c., being massive and pyramidal in outline with close tiers of rather stiff horizontally spreading, or drooping branches. It attains a height of about 300 ft. with a trunk 5 ft. in diameter in a wild state. The young shoots are usually smooth and flexuous, olive-brown in colour, with spreading blunt linear leaves 1½–2 in. long, in two or more rows, and with a prominent midrib beneath. The colour varies a good deal, but the prevailing tint is olive-green above and silvery white beneath. The beautiful rich chestnut-brown cones are borne in whorls near the ends of the shoots and are oblong, 3 in. long, and bluntly conical in shape.

Many if not most of the plants grown as *A. lasiocarpa* in gardens are *A. lowiana*, and the plants, if any, called *A. parsonsiana* also belong here.

Culture &c. as above.

A. magnifica (*A. campylocarpa ; Picea magnifica*). — A stately tree native of N. California where it grows 200–250 ft. high, with a trunk 8–10 ft. in diameter, at 5000–8000 ft. elevation. It has tiers or whorls of horizontally spreading branches, the twigs of which are thickly clothed with linear olive-green leaves 1–2 in. long, glaucous above when young, and with 2 silvery stripes beneath. Cones 6–7 in. long, about 3 in. broad, oblong, cylindrical, and very flat or blunt at each end.

Culture &c. as above.

A. Mariesi.—A native of the mountains of Japan, where it grows in shallow peat on volcanic débris at 5000–7000 ft. elevation, and forms a tall pyramidal tree with strong spreading branches, the lower ones slightly bent down, but turned up at the ends, the younger ones being covered with a brownish hairy epidermis. Leaves about 1 in. long, blunt, linear, tapering into a very short twisted stalk, dark green above, rather glaucous beneath, and arranged more or less irregularly in four rows. Cones 3–5 in. long, erect, oblong cylindrical, of a dull blackish-purple.

Culture &c. as above. This species was introduced about twenty years ago and is still very little known. It seems to be quite hardy.

A. nobilis (*Picea* and *Pinus nobilis*). A majestic and quick-growing tree, native of the Oregon and Californian mountains, where with *A. amabilis* it forms extensive forests, and attains a height of 200–300 ft., with a trunk 8–10 ft. in diameter. It is easily recognised by its graceful habit and regular tiers of branches clothed with deep glaucous linear leaves about 1¼ in. long, and silvery white beneath. The beautiful oblong cylindrical cones 7–9 in. long, erect and slightly tapering upwards, are brownish in colour, with projecting pointed and ragged-edged bracts bent downwards. The varieties *glauca* and *robusta* are improvements on the already beautiful type, the variety *robusta* having shorter and broader cones, long-tailed bracts, and denser masses of foliage.

Culture &c. as above. This is a free-growing species and enjoys a rich loam in situations sheltered from bleak north and east winds. At Birr Castle, King's Co., the seat of Earl Rosse, there is a splendid tree which a few years ago was 83 ft. high, and is now probably over 90 ft. At Coul House, Ross-shire, there is also a fine specimen about 70 years old and about 80 feet high.

A. nordmanniana (*Picea nordmanniana*).—*Nordmann's Fir.*—A stately and ornamental tree, native of the Crimea and Caucasus, where it reaches a height of 80–100 ft. It has a graceful and regular outline and masses of rich glossy green stiffish flat linear leaves about 1 in. long, more or less spreading in two rows owing to a half twist at the base. The erect cones 4–6 in. long are shortly stalked, slightly ovoid in shape, and have large leathery three-lobed fringed bracts, projecting much beyond the scales.

Culture &c. as above. Nordmann's Fir when grown as a lawn or park tree is difficult to surpass among the Conifer family. It flourishes in stiff peaty loam with plenty of vegetable matter, and on light gravelly soils. It is excellent for planting on declivities near water, and will thrive very often where other Common Silver Firs (*A. pectinata*) and even the Larch become injured. For ornamental gardening purposes, however, it is best to plant it in the most favourable situations. At Poltalloch, in Argyllshire, there is a vigorous tree which a few years ago was 70 ft. high, and there are several fine specimens of smaller dimensions scattered throughout the kingdom.

A. numidica (*A. baborensis*).—A native of N. Africa, where it is found with the Atlas Cedar at elevations between 4000 and 6000 ft., and attains a height of 40–60 ft. It has a graceful outline, and masses of dark green linear leaves ½–1 in. long, silvery white beneath. The erect cylindrical cones 5–8 in. long are usually borne in clusters of 4 or 5, having kidney-shaped greyish-brown scales enclosing a thin dry and shrivelled bract.

Culture &c. as above.

A. pectinata (*A. alba; A. excelsa; A. Picea; A. vulgaris; A. taxifolia; Picea* and *Pinus pectinata; Pinus Abies; Picea Abies*).—This handsome tree is the Common Silver Fir of the mountains of Central and S. Europe, and reaches a height of 80–100 ft. It has blunt flat linear leaves ½–1 in. long, shining green above, with two silvery stripes beneath on each side of the midrib, and generally arranged in two rows. The erect cylindrical cones are 6–8 in. long, deep brown when ripe.

There are many forms of the Common Silver Fir mentioned in catalogues, the chief being *aurea, columnaris, fastigiata, brevifolia, pyramidalis, stricta, tortuosa, variegata &c.*—names which convey an idea of the peculiarity of the variety.

Culture &c. as above. The Common Silver Fir grows well in almost all parts of the British Islands, and as a timber tree it is also well worth cultivation. There are many fine specimens in gardens, but those at Carton, Kildare, the seat of the Duke of Leinster, and at Rossdhu, Dumbartonshire, both of which in 1891 were over 110 ft., may be quoted as exceptionally fine. The tree at Rossdhu is about 117 years old.

A. Pinsapo (*Picea Pinsapo*).—*Spanish Silver Fir.*—A fine Spanish Conifer 60–80 ft. high, with a very regular and symmetrical habit, and linear roundish bright green leaves, about ½ in. long, faintly striped with silvery white on the inner surface. The sessile ovoid or oblong cones are 4–6 in. long and about 2 in. wide, with broad rounded scales concealing the short bracts. There are varieties called *Hammondi* and *glauca.*

Culture &c. as above.

A. religiosa (*A. hirtella; Picea religiosa*).—A beautiful species native of the mountains of Mexico at an elevation of 9000 ft., where it forms a fine tree about 150 ft. high. It has linear acute leaves about 1½ in. long, and roundish ovoid cones about 3 in. long.

Culture &c. as above. This species is not generally cultivated, as it is regarded as being too tender for the British Islands. At Fota Island, Cork, however, there is a lovely tree which flourishes and is quite hardy there in an open situation in light loamy soil. In 1891 it was 60 ft. high.

A. sachalinensis.—A native of Japan and the Island of Sachalin, where it forms a tall pyramidal tree about 130 ft. high, with rigid, linear, blunt leaves, 1 in. or more long, arranged in many rows and twisted to one side. The erect cylindrical cones are about 3 in. long and 1 in. wide, rounded at the apex, and having transversely oblong kidney-shaped scales with inflexed toothed edges, and projecting obovate serrulate bracts ending in a reflexed angular point.

Culture &c. as above. It is not yet well known, but seems to be quite hardy.

A. sibirica (*A. Pichta; Picea Pichta*). A native of N. and E. Russia, with dark green leaves, silvery white beneath. This is a very slow-growing species, and it takes years to obtain a really good specimen in this country.

Culture &c. as above.

A. Veitchi (*A. Eichleri; A. nephrolepis; Picea Veitchi; Pinus selenolepis*). A beautiful Japanese tree attaining a height of 120–140 ft. in a wild state at elevations between 6000 and 7000 ft. The leaves are crowded and spreading in two rows, ½–1 in. long, flat, linear, glaucous above, silvery beneath. The erect somewhat cylindrical cones, 2–3 in. long and about 1 in. wide, are purple-brown, with kidney-shaped scales enclosing a short wedge-shaped bract.

Culture &c. as above. Although first introduced forty years ago, and again twenty years ago, it is still not largely grown.

A. webbiana (*A. chiloënsis; Picea webbiana*).—A handsome pyramidal tree found on the eastern Himalayas at elevations between 9000 and 13,000 ft. and growing 80–90 ft. high. Its numerous horizontally spreading branches are much divided and densely clothed with beautiful light green linear leaves about 1–2½ in. long, silvery beneath. The deep purple cylindrical cones are 6–7 in. long and 2 in. or more broad, with roundish kidney-shaped scales and oblong pointed bracts.

The variety *Pindrow* (otherwise known as *Abies*, *Picea*, and *Pinus Pindrow*) has longer and more sharply toothed leaves and smaller cones. There are specimens of the type in various parts of the country varying from 30 to 60 ft. high.

Culture &c. as above.

PSEUDOLARIX (Golden, False or Chinese Larch).—A genus containing only one species:—

P. Kæmpferi (*P. Fortunei; Abies, Larix* and *Pinus Kæmpferi*).—A highly ornamental tree native of China, where it reaches a height of 120–130 ft., and has branches like those of the Common Larch. The leaves are in bundles on the full-grown branches, but scattered on the young shoots, linear lance-shaped, 1½–2½ in. long, beautiful bright green when young, turning to golden-yellow in autumn—hence the popular name of Golden Larch. The drooping cones are about 3 in. long and 2½ in. wide near the base, tapering upwards, with deciduous scales.

Culture and Propagation.—The Golden Larch is perfectly hardy and succeeds on a gravelly loam. It is the only golden-leaved Conifer that loses its foliage, and even in a leafless state the yellowish-green or golden-brown of the young shoots is very effective and beautiful. It may be increased by seeds sown when ripe in cold frames and transplanted when the seedlings are 2 or 3 years old.

LARIX (Larch).—A genus of ornamental trees with long shoots and scattered or tufted linear leaves, which fall in winter. Flowers monœcious, the male catkins in egg-shaped short spikes, the female ones erect, solitary, ovate and much longer than the males. Cones small, bluntly ovoid or somewhat cylindrical, and consisting of a few woody persistent scales. Seeds winged, very small. Seed leaves 6–8, 3-cornered or flat.

Culture and Propagation. — The culture and propagation of the Larch follow the same lines as laid down for the Pines (p. 990). In spring time, when the new leaves are developing, they are very effective objects in the landscape on account of the beautiful fresh green colour of the foliage in striking contrast to the brown and greyish trunks.

L. europæa (*L. decidua; L. excelsa; L. pyramidalis; Pinus Larix*).—*Common Larch.*—A well-known European tree, 80–100 ft. high, with horizontally spreading branches and soft, bluntly linear bright green leaves in spring, gradually assuming a more sombre hue. Cones erect, about 1 in. long, oblong ovoid, ripening late in autumn and remaining a long time on the trees.

Culture and Propagation.—The Larch is far more valuable as a timber tree than as an ornamental plant for the park or garden. Judiciously mixed with other trees, especially evergreens, it serves as a contrast in early spring with its bright foliage, and in winter with its bare branches. The Larch grows naturally at high altitudes on the Alps and mountains of N. Europe in a pure atmosphere, with plenty of sunshine, and although it likes plenty of moisture the drainage at the roots must be perfect. After its long winter sleep, the branches quickly burst forth into leaf in early spring, and are often injured by the frosts at that period. Of late years plantations of Larches have suffered a good deal from the ravages of a disease or canker due to the parasitism of a minute fungus called *Peziza Willkommi*, which spreads rapidly once it has taken a hold. Too much moisture, bad drainage, and spring frosts render the trees more liable to attack, and favour the growth of the fungus. There are several varieties of the Common Larch, *pendula* with a drooping habit being best known. The variety *sibirica* seems to have a more robust constitution than the ordinary variety.

L. leptolepis (*L. japonica; Abies leptolepis*).—A beautiful Japanese Larch, about 40 ft. high but often becoming a mere shrub about 2 ft. high at great elevations on the Japanese mountains. The smooth round branches radiate regularly from the trunk, and have slender drooping twigs clothed with blunt linear leaves ¾–1¼ in. long. Cones bluntly ovoid rounded, with numerous thin flat greyish-brown scales. The seeds are shed naturally, but the cones remain on the trees for years.

In its young state this Larch is very beautiful, and there is some doubt as to whether it is not really a form of the Golden Larch—*Pseudolarix Kæmpferi*. The specimens of both are still few and far between.

Culture &c. as above.

L. occidentalis (*L. americana brevifolia; Pinus Nuttalli*).—A noble pyramidal tree, native of N.W. America, where on the moist mountain slopes at an elevation between 2500 and 5000 ft. it reaches a height of 100–150 ft. with a trunk 3–5 ft. in diameter, and is known as the 'Great Western Larch.' The lower branches are horizontal and slightly decumbent, the upper ones ascending. The leaves are produced in bundles or clusters of 14–20, erectly spreading, stiff, linear, pale green, ½–¾ in. long. The solitary erect ovoid elliptic cones are 1–1¾ in. long, with roundish loosely imbricated scales, covering a smaller bract with a long protruding awl-shaped point.

The bark of young trees is thin, scaly, dark grey or brown, changing to bright cinnamon-red when old.

Culture &c. as above.

L. pendula (*L. americana; Pinus microcarpa; P. pendula &c.*).—*American Black Larch, Tamarack,* or *Hackmatack.* A slender, graceful tree native of the United States, where in moist uplands or cold wet swamps it reaches a height of 80–100 ft., with a trunk 2–3 ft. in diameter. Its branches spread horizontally, and the twigs are clothed with shorter and more slender leaves than those of the Common Larch, and the brownish ovoid cones are about 1 in. long.

Culture &c. as above.

CONIFERS USEFUL FOR VARIOUS PURPOSES

As it would no doubt be found impracticable in most cases, even in the largest gardens, to grow anything like the number of Conifers described in the foregoing pages, the following list of the best species selected for various purposes may be found useful. The numbers after the names indicate the pages at which the plant will be found described.

I. *A select list of the best Conifers for parks, large gardens, and pleasure grounds*

Abies amabilis, p. 1001.
„ brachyphylla, p. 1002.
„ cephalonica, p. 1002.
„ concolor, p. 1002.
„ grandis, p. 1003.
„ lowiana, p. 1003.
„ magnifica, p. 1003.
„ nobilis, p. 1003.
„ nordmanniana, p. 1004.
„ numidica, p. 1004.
„ pectinata, p. 1004.
„ Pinsapo, p. 1004.
„ webbiana, p. 1005.
Araucaria imbricata, p. 989.
Cedrus atlantica, p. 995.
„ „ glauca, p. 995.
„ Deodara, p. 995.
„ Libani, p. 996.
Cryptomeria japonica, p. 982.
„ „ elegans, p. 982.
Cupressus Lawsoniana, and vars., p. 978.
„ macrocarpa, p. 979.
„ nootkatensis, p. 979.
„ obtusa, and vars., p. 979.
„ pisifera, and vars., p. 979.
„ thyoides, p. 980.
Ginkgo biloba, p. 987.
Juniperus chinensis, and vars., p. 980.
„ Oxycedrus, p. 981.
„ recurva, p. 981.
„ virginiana, and vars., p. 982.

Larix europæa, p. 1005.
„ leptolepis, p. 1006.
„ pendula, p. 1006.
Libocedrus decurrens, p. 975.
Picea ajanensis, p. 996.
„ alba, p. 997.
„ alcockiana, p. 997.
„ Engelmanni, p. 997.
„ excelsa, and vars., p. 997.
„ Morinda, p. 997.
„ nigra, p. 998.
„ orientalis, p. 998.
„ polita, p. 998.
„ pungens glauca, p. 998.
„ sitchensis, p. 998.
Pinus banksiana, p. 990.
„ Cembra, p. 990.
„ contorta, p. 991.
„ Coulteri, p. 991.
„ excelsa, p. 991.
„ insignis, p. 991.
„ Laricio, p. 992.
„ „ nigricans, p. 992.
„ montana, p. 992.
„ monticola, p. 993.
„ Peuke, p. 993.
„ ponderosa, p. 994.
„ sabiniana, p. 994.
„ Strobus, p. 994.
„ sylvestris, p. 995.
Prumnopitys elegans, p. 988.
Pseudolarix Kæmpferi, p. 1005.
Pseudotsuga Douglasi, p. 1000.
Sciadopitys verticillata, p. 989.
Sequoia gigantea, p. 984.
„ sempervirens, p. 984.
Taxodium distichum, p. 988.
Taxus baccata, and vars., p. 985.
Thuya dolabrata, p. 976.
„ gigantea, p. 976.
„ occidentalis, p. 976.
„ orientalis, p. 976.
„ plicata, p. 976.
„ warreana, p. 977.
Tsuga canadensis, p. 999.
„ mertensiana, p. 999.
„ pattoniana, p. 1000.

II. *A select list of the best Conifers for rock gardens*

Cryptomeria japonica nana, p. 982.
Cupressus Lawsoniana nana, p. 978.
„ nootkatensis, p. 979.
„ obtusa nana, p. 979.
„ pisifera, p. 979.
„ thyoides, p. 980.
Juniperus communis, p. 980.
„ „ japonica, p. 980.
Juniperus recurva, p. 981.
„ „ squamata, p. 981.
„ Sabina, p. 981.
„ „ prostrata, p. 982.
„ „ variegata, p. 982.
Picea excelsa clanbrassiliana, p. 997.
„ „ pumila glauca, p. 997.
„ „ pygmæa, p. 997.
Pinus Laricio pygmæa, p. 992.
„ montana, p. 992.
„ Strobus nana, p. 994.
„ sylvestris pygmæa, p. 995.
Taxus baccata and dwarf vars., p. 985.
Thuya dolabrata, p. 976.
„ occidentalis Ellwangeriana, p. 976.
„ orientalis aurea, p. 976.

III. *A list of the best Conifers for wind breaks*

Abies nordmanniana, p. 1004.
„ pectinata, p. 1004.
Cupressus lawsoniana, p. 978.
„ nootkatensis, p. 979.
Larix europæa sibirica, p. 1005.
Picea excelsa, p. 997.
Pinus Cembra, p. 990.
„ Laricio, p. 992.
„ „ nigricans, p. 992.
„ Pinaster, p. 993.
Taxus baccata, p. 985.
Thuya gigantea, p. 976.
„ occidentalis, p. 976.
Tsuga canadensis, p. 999.

IV. *A list of the best Conifers for exposed positions near the sea*

Abies nordmanniana, p. 1004.
„ pectinata, p. 1004.
Cupressus macrocarpa, p. 979.
Pinus insignis, p. 991.
„ Laricio, p. 992.
„ „ nigricans, p. 992.
„ Pinaster, p. 993.
„ sylvestris, p. 995.
Sequoia sempervirens, p. 984.

V. *Select list of variegated and decorative foliaged Conifers*

Abies nobilis glauca, p. 1003.
Cupressus Lawsoniana lutea, p. 979.
„ „ albo-variegata, p. 979.
„ „ aureo-variegata, p. 979.
„ obtusa aurea, p. 979.
„ pisifera plumosa aurea, p. 979.
Juniperus chinensis aurea, p. 980.
Picea pungens glauca, p. 998.

Pseudotsuga Douglasi Stairi, p. 1001.
Taxus baccata aurea, p. 986.
„ „ fastigiata argentea, p. 986.
„ „ „ aurea, p. 986.
Thuya dolabrata variegata, p. 976.
„ occidentalis aurea, p. 976.
„ orientalis elegantissima, p. 977.
„ „ aurea, p. 977.

VI. *A list of the most valuable Conifers for timber trees, woods, and forests*

Abies grandis, p. 1003.
„ nobilis, p. 1003.
„ nordmanniana, p. 1004.
„ pectinata, p. 1004.
Cedrus atlantica, p. 995.
Cupressus lawsoniana, p. 978.
„ macrocarpa, p. 979.
Larix europæa, p. 1005.
Picea excelsa, p. 997.
„ sitchensis, p. 998.
Pinus Cembra, p. 990.
„ insignis, p. 991.
„ Laricio, p. 992.
„ „ nigricans, p. 992.
„ monticola, p. 993.
„ Strobus, p. 994.
„ sylvestris, p. 995.
Pseudotsuga Douglasi, p. 1000.
Sequoia sempervirens, p. 984.
Thuya gigantea, p. 976.
Tsuga mertensiana, p. 999.

CXXXI. FILICES—Fern Order

This beautiful group of plants, in conjunction with Mosses, Lichens, Fungi (including Mushrooms), is placed in the 'flowerless' or 'cryptogamic' division of the vegetable kingdom, chiefly because the plants belonging to it are destitute of what are commonly known as flowers having stamens and pistils, as in all the plants described in the preceding pages of this work.

The Ferns or Filices proper are usually herbaceous or shrubby plants, sometimes attaining the dimensions of trees in tropical countries and parts of the South temperate hemisphere. They have either fibrous roots or creeping rhizomes. The leaves are usually called 'fronds,' and are tufted or alternate, simple or more or less divided, and usually circinate, or curled inwards from the apex like a crosier, when first developing, except in the Adder's Tongue Ferns (*Ophioglossum*) and the Moonworts (*Botrychium*), in which they are straight. The stalk of the frond is called a 'stipes,' and the midrib a 'rachis.' There are no flowers as usually understood, but what is usually called the 'fructification' takes their place, and consists of minute helmet-like capsules, borne in clusters, called 'sori,' on the under edge or surface of the fronds, or sometimes on separate fronds, as in *Ophioglossum*, *Botrychium*, and *Osmunda*. The clusters of sori vary in shape and size, being sometimes round and about the size of a pin's head, and sometimes in long streaks on the under surface or edges, but always of a golden or brownish colour. Sometimes they are covered with a membranous coat called an 'involucre' or 'indusium,' roundish as in the Prickly Shield Fern (*Aspidium aculeatum*), kidney-shaped as in the Male Fern (*Nephrodium Filix-Mas*), oblong as in the Spleenworts (*Asplenium*) and Hart's Tongue (*Scolopendrium*), but often they are quite naked as in the Polypodiums, or borne in little cups, as in the Killarney Fern (*Trichomanes*) and the Tunbridge Fern (*Hymenophyllum*). The capsules, or 'sporangia' as they are termed, are either stalked or sessile, and each one contains a number of microscopic seed-like bodies known as 'spores.' These spores are popularly called seeds, but their functions partake more of the character of the stamens and pistils in ordinary flowers.

Reproduction of Ferns

When the spores or 'seeds' are set free by the bursting of the capsules and fall on to a damp surface in a suitable temperature, they very soon germinate. Mr. Britten says: 'The result is—not a young ascending plant and descending roots, as in flowering plants—but a very small green body which lies flat on the ground and sends out delicate rootlets from its under side.' This is known as the 'prothallus' or 'prothallium.' On it are produced minute bodies which practically correspond to the stamens and pistils in flowering plants, and are known as 'antheridia' and 'archegonia' respectively. The antheridia, or male organs, when ripe burst, and set free a number of spirally twisted moving bodies called 'spermatozoids' or 'antherozoids,' the function of which corresponds to that of an ordinary pollen grain. The 'archegonia,' or female organs, are bottle-shaped and correspond to the ovary of flowering plants. Each one contains a minute cell, called the 'oosphere,' at the base. When one of the spirally twisted 'antherozoids' passes down the open neck of the archegonium and mingles with the oosphere, fertilisation has taken place, and the result, called an 'oospore,' now practically corresponds to an ordinary seed, as from it the young Fern plant springs.

PROPAGATION OF FERNS

Nearly all Ferns are easily increased from spores, but a goodly number may also be multiplied by division of the crowns, and by means of small plantlets or bulbils which are developed on the fronds. The spores are sown exactly as if they were ordinary seeds, but being very minute great care must be exercised to sow them over the surface of the soil as thinly and evenly as possible. As most soils contain the seeds of weeds which are apt to germinate more quickly than the Fern spores and thus choke the latter, it is usual to sterilise the soil in some way. Baking the soil is often practised, but this always has the disadvantage of taking time, is often inconvenient, and the organic substances or gases in it are driven off into the atmosphere, leaving it poorer in plant food. A simple method of killing the seeds of weeds, fungi &c. in the soil is to pour boiling water over it after it has been prepared for the reception of the spores. When cold the spores may be sown as recommended, but should not be covered with soil. A sheet of glass placed over the pot or pan in which they are sown will afford protection and prevent quick evaporation from the soil. Watering the spore-pots overhead is not to be recommended, as they are apt to be either washed out altogether with the water or into a heap at one side. A good plan is to stand the pots in saucers of water so that the soil will absorb moisture in this way by capillary attraction. The pots or pans in which Fern spores are sown should be exceptionally well drained. Pots are on the whole preferable to pans. A small pot may be inverted inside the one used—usually a 5 in. pot—and around and over it are placed broken 'crocks' or pieces of pot, to within 2–3 in. of the rim. A layer of moss or fibrous matter is placed over the crocks to prevent the finer soil being washed in among them, and in this way perfect drainage is secured. The finer soil, consisting of sharp sand, loam, and peat, is then placed over this to within about ½ in. of the rim, perhaps a little more. The surface on which the spores are to be sown should be quite level and very fine, although many prefer a rough surface with little pieces of burned brick strewn over it.

The spores of some Ferns germinate quickly, others more slowly, as with the seeds of different flowering plants. If always kept damp as recommended and in a suitable temperature, the surface of the soil after a short time becomes covered with masses of deep green translucent scales which look like mosses or lichens. These scales are really the 'prothallia' referred to above. On the under surface among the delicate rootlets (or rhizoids) the antheridia and archegonia are being developed, and in due course fertilisation of the oospheres by the antherozoids takes place. The oospore thus formed then germinates and from it is produced the first delicate Fern-leaf or frond which pushes its way up between the prothallia. When the whole surface is covered with small fronds the young Ferns may then be pricked out about 1 in. apart into other pots or pans prepared with similar soil and good but not so elaborate drainage as before. Until the young plants get established they must be kept rather close, and alway moist. After a time, as they begin to grow and fill up, more air may be given, and in a few months, according to size and vigour, each plant or two or three together may be placed in separate pots, and grown on in the same way as an ordinary flowering plant, except that most Ferns prefer shade to bright sunshine.

This is briefly the way in which both hothouse and hardy Ferns are raised from 'seed.' The hardy Ferns with which this work is chiefly concerned may be raised in a cold frame, and many of them reproduce themselves readily out of doors without any artificial aid. When the spores are ripe they are blown about by the wind into nooks and crannies, and there germinate and produce plants in due course.

Some of the rarer and more delicate kinds, however, are best sown carefully, and pricked out as advised. The spores should never be allowed to get thoroughly ripe on the fronds before gathering, otherwise they may be lost altogether. A safe way to harvest Fern spores is to place the fronds containing fairly ripened spore-cases into white paper bags, and hang them up to ripen. In a few days the brown spores will have escaped from the spore cases, looking like brown flour or dust in the bag. When they are not likely to be disturbed or blown away by draughts of air, the fronds may also be placed on a sheet of white paper, on to which the spores will fall, leaving the shape of the frond beautifully outlined on the surface.

When Ferns admit of division this operation is best performed in spring just as the crowns are about to start into growth. If divided in the autumn when the fronds have withered it is safer to shelter the divided portions in cold frames (having previously potted them up) until spring. Some kinds may be increased by means of the bulbils on the fronds. These bulbils are detached easily with the finger and thumb when large enough to handle, and dibbled into pots or pans of prepared soil just deep enough to prevent them falling over. In a very short time they root and make good plants. This is a much quicker way of obtaining strong plants than by spores, but comparatively few ferns have the power of producing these offsets or bulbils.

HYBRID FERNS

Although the reproductive process in Ferns differs a good deal from that of ordinary flowering plants hybrids have nevertheless been produced between some species. But whereas man can readily control the production of a hybrid in the case of flowering plants by transferring the easily seen pollen from one species to the usually obvious stigma of another, it is all more or less a matter of chance with Ferns. Anyway man cannot very well take a microscopical antherozoid and ram it down the neck of the archegonium, so that he must leave the operation to nature. When he wishes to obtain a hybrid between two species his only chance is to sow the spores of them together in the same pot. Then perchance an antherozoid—which has the power of moving about in moisture, hence the necessity of water—of one species may stray into the archegonium of the other species and fertilise its oosphere at the base. The result would undoubtedly be a hybrid when it developed and would be more or less intermediate in character between the two species. Genuine hybrid Ferns, however, are very rare, although hundreds of what may be called 'seminal' varieties of the same common species exist, and are always increasing in diversity. Just as in flowering plants hybrids can be obtained only by closely related species or genera, so with Ferns. The nearer the natural relationship between one species, variety, or genus and another, the more likelihood of obtaining a real hybrid.

FERN 'FREAKS'

The ordinary development of a Fern as described above includes four distinct stages, namely (1) the spore, (2) the prothallium, (3) sexual action between antheridia and archegonia, and (4) the Fern plants. It happens, however, that one of these stages may be altogether missed in the development of the plant.

Sometimes the spore stage is omitted altogether, and the prothallium is developed directly on the fronds, and from it arises a new plant. This is known as *apospory*, and must not be confounded with the mere vegetative outgrowths known as bulbils or offsets alluded to before.

Sometimes the sexual process or fusion between the contents of the antheridia and archegonia does not take place, owing probably to one or the other being absent or sterile; nevertheless the prothallium produces a fern plant and skips the sexual process. This is called *apogamy*.

Instances of both apospory and apogamy have been proved in connection with several British Ferns, but a still more remarkable fact has also been discovered. In the cycle of development, the Fern plant itself is occasionally omitted altogether. Instead of the prothallium producing a plant as in the usual course, it, as it were.

skips that part of the business, and produces clusters of sporangia instead. As the spores, sexual organs, and plant have been in turn suppressed, it now only remains to discover an instance where a plant is produced direct from the spore—omitting the development of the prothallium and sexual organs—to make the cycle of Fern freaks complete.

It must be understood that these deviations from the ordinary routine in the development of a Fern plant are by no means common, and they require the practised eye of an enthusiastic Fern grower to discover them. Why they should take place is a matter scarcely explainable, but they are probably due to some special or unusual treatment to which the plants are subjected.

Plumose, Tasselled, or Crested Ferns

The Ferns to which these terms apply are so beautiful and varied that they require special mention. They are mostly 'monstrous' or abnormal forms, and many of our native species have produced exquisite forms, which by cultivation and selection have been vastly improved upon. The plumation, tasselling, or cresting consists in the ordinary fronds being developed into broad, leafy, or feathery expansions, usually accompanied by partial or total sterility, that is, the absence of spores to a greater or less degree on the parts which have become feathery or crested

This 'feathering' corresponds roughly to the doubling of flowers, and increases or decreases under good or bad treatment, much in the same way. For instance, a very feathery or crested Fern, grown in a good soil and a suitable situation, will very likely 'revert' to the original form from which it developed if placed in poor soil and an unfavourable situation. The Fern-grower must therefore never be astonished either to see seedlings from a normal form develop crested or feathered fronds, or any of the latter lose their plumation, according to circumstances and treatment.

With a little intelligent care the forms of crested or abnormal Ferns can be produced *ad infinitum* from spores, especially when the spores of two or three nearly related varieties are sown together. Some years ago I saw a form of Hart's Tongue exhibited by Mr. E. J. Lowe, in which were blended the characteristics of three or four varieties on a single frond—the result, as Mr. Lowe affirmed, of three or four antherozoids from as many different varieties having fused with the single oosphere of the archegonium. This however is in flat contradiction to what is generally known, and it seems to be perfectly impossible for an oosphere to be fertilised with more than one antherozoid at one and the same time. With a succession of 'crossings,' however, extending over several years, there is nothing improbable in one plant having the characters of several parents—as is well known with Orchids and other flowers.

Cultivation of Ferns

Although hardy Ferns have nothing showy in the way of bright and beautifully coloured flowers to attract the gardener, they are nevertheless so beautiful, so rich in outline, so varied in size, and may be used in so many ways, that they deserve every attention from the real lover of gardening. One often sees bare patches in gardens, where no ordinary flower, plant, or shrub will grow well, which would be an ideal home for certain hardy Ferns. But the function of Ferns is not altogether to fill up spaces where nothing else will grow. They have their use in the rockery, the flower border, the shrubbery, the dell, and are probably better and more handsome mixed with flowers than grown by themselves in a formal Fernery. They have their likes and dislikes regarding soil and situation, shade and sunshine, and it is necessary to study the peculiarities of each group to obtain the most satisfactory results. A grouping according to their botanical affinities or according to their heights, as is often done, is not to be recommended. This results in monotony and sameness of outline—the very things to be avoided. Probably the most artistic and at the same time most convenient method in planting a varied selection of Ferns is to place all those requiring the same cultural treatment together. Different genera, species, and varieties, of varying heights and forms, will thus be brought in contact with each other, and the contrast between one and the other will add an interest and attractiveness to the whole.

Speaking generally, hardy Ferns love shade from the hot sun, which scorches them, plenty of moisture at the root, and shelter from violent winds which break their fronds. They like abundance of light, however, and should not be planted too closely together, otherwise they will be unable to display to the best advantage the graceful outlines of their fronds.

While revelling in moisture both at the root and in the atmosphere, stagnant moisture in the soil is fatal to them sooner or later. The soil should therefore always be thoroughly well drained, although kept moist. Some kinds, like the Royal Fern, grow naturally in boggy and marshy situations, and should have similar situations in the garden. Others, like some of the Spleenworts, flourish in drier positions, but still their roots are usually found buried in moist crannies. When planted in the rock garden, particular attention should be given to the plants in hot weather, and frequent soakings of water at 'early morn or dewy eve' will keep them in a beautifully fresh condition.

Besides suitable positions in regard to light, shade, and moisture, good soil is an important consideration. Good rich loam with plenty of sharp sand, and also well-decayed leaf-soil and peat, forms a good all-round compost that may be readily varied at will. The marshy kinds require more peat and leaf-mould than other sorts, and the soil in which they are planted can be made up accordingly. Some of the delicate kinds, including the Filmy Ferns (*Trichomanes* and *Hymenophyllum*) are too tender and valuable to trust out of doors with the hardier and sturdier sorts. They are often grown in specially prepared structures, called Wardian frames—miniature cold greenhouses in reality—where they flourish in shade and moisture, often in a window of an ordinary dwelling house facing north, or shaded from the sun.

Although many species lose their fronds in winter, and look somewhat untidy, it is better not to cut the withered fronds away until spring. They serve as a natural protection to the crowns, and in severe winters are very serviceable in preventing the plants from being killed.

In the following descriptions of Hardy Ferns, where special soils, situations &c. are necessary for particular species, those facts will be mentioned.

They may be classified into the following sub-orders or tribes:—

Tribe I. (Polypodiaceæ).—Fronds more or less leathery, circinate in vernation. Indusium marginal, dorsal, or absent. Spore-cases small, usually stalked, not on a raised receptacle, partially or wholly surrounded with a vertical elastic ring bursting transversely.

ADIANTUM (Maidenhair).—The plants of this genus have tufted or creeping rootstocks and slenderly stalked compound fronds pinnately divided 2–4 times, veins forked or netted. Sori (*i.e.* the clusters of spore-cases called *sporangia*) rounded or oblong, parallel with and on the margin. Indusium formed of the reflexed edge of the pinnules.

About a hundred species of Maidenhair Ferns are known, but only those mentioned below can be regarded as sufficiently hardy for outdoor cultivation in the British Islands.

A. Capillus-Veneris.—This pretty and graceful evergreen Maidenhair Fern is found on damp rocks, walls &c. near the sea in Dorset, Devonshire, and Cornwall, and in mild parts of the West of Ireland. It grows 6–12 in. high, having fronds irregularly and pinnately divided 3–4 times into alternate wedge-shaped crenate pinnules or leaflets. The slender stipes (stalk) and rachis (midrib) are almost black, shining and brittle.

Culture and Propagation.—Although a native species, the common Maidenhair is too tender for most parts of the country. It grows best on damp walls and rocks in moist and warm shady situations, and may be increased by spores, or careful division of the creeping scaly rootstocks in spring. See also p. 1009.

A. pedatum.—A beautiful North American Maidenhair Fern 9–12 in. high, recognised by its forked fronds, the main divisions of which have whip-like branches and wedge-shaped pinnules ½–¾ in. long, broadest near the stem, the upper and outer edges being lobed.

Culture and Propagation.—This species in warm, moist, and sheltered situations forms large tufts of fronds, and is valuable for such positions in the lower parts of the rock garden or even in moist peaty borders. It flourishes in damp turfy peat and sandy loam and requires thorough drainage. Increased by spores, or division of the rootstocks in spring or autumn. If divided in autumn, the plants are safest in winter in a greenhouse, so that they may become established more quickly, and be sturdy for spring planting. See also p. 1009.

ONYCHIUM.—The only species of this genus that can be grown out of doors in the mildest parts of the country is *O. japonicum*, an elegant Fern from China and Japan. Its fronds over 1 ft. long and 6 in. broad, with stalks about the same length, are broadly ovate in outline, and four times pinnately divided into numerous pinnules and segments, on the back of which are borne linear clusters of spore-cases.

Culture and Propagation. — This species flourishes in sandy loam and peat in moist and warm parts of the country. Increased by spores. See p. 1009.

PTERIS (Brake or Bracken).—The only species of this genus fit for outdoor cultivation is our native Bracken (*P. aquilina*), which is common in woods, heaths, moors &c. in all parts of the British Islands. From its stout creeping rootstocks spring fronds 2–6 ft. high with stout stalks. In early spring is the best time to lift large clumps of it from the moors or commons and transfer them to the wilder parts of the garden, where they may serve as screens or covers. If planted in peaty soil and given a good soaking they will grow without any trouble. The dried fronds will be found useful for protecting tender plants in other parts of the garden. There are several forms worth growing, such as *congesta*, *cristata*, *depauperata*, *grandiceps pendula*, *flexuosa cristata*, and *polydactyla*. See also p. 1009.

CRYPTOGRAMME (Parsley Fern; Rockbrake). — **C. crispa** (*Allosorus crispus*).—This elegant native Fern resembles at first sight a tuft of Parsley, owing to its dense tufts of pale green fronds which appear in May and June and gradually wither in autumn. They are about 6 in. high and somewhat deltoid or 3-cornered in outline with a rather long, slender, smooth, pale brown stalk. The fronds are twice or thrice pinnately cut into wedge-shaped or oblong pinnules, notched or cleft at the end. Two kinds are borne, the outer ones being leafy and barren, the inner ones contracted and spore-bearing, the recurved margins forming the indusium.

Culture and Propagation. — The Parsley Fern grows naturally in loose stony places in mountainous parts of England and Scotland. It may be grown in the rockery in moist but well-drained sandy loam and peat between pieces of stone or rock in such a way that it will receive plenty of light and air, and at the same time be shaded from the scorching sun. See also p. 1009.

LOMARIA (Hard Fern).—The Hard Ferns have short or creeping rootstocks and tufted fronds, the outer ones of which are barren, or spore-bearing at the base only, the inner ones being usually fertile, with linear sori, close to the margin. Indusium scarious.

Culture and Propagation.—Lomarias flourish in shaded but lightsome parts of the rockery in rich sandy loam, peat and leaf soil. Increased by spores or careful division. See also p. 1009.

L. alpina. — A pretty New Zealand species with a slender creeping rootstock and tufts of pinnately cut fronds 4–8 in. long, the inner fertile ones being somewhat longer and narrower than the outer ones.

Culture &c. as above. This species is somewhat tender, and requires warm sheltered situations among pieces of rock and stone. See also p. 1009.

L. Spicant (*Blechnum Spicant; B. boreale*).—This is our native Hard Fern, having stout creeping rootstocks, and erect or spreading leathery bright green pinnate and pinnatifid fronds, with polished red-brown stalks. The pinnules of the spore-bearing fronds are narrower than those of the barren ones, but are long and narrow, like the blunt teeth of a comb, in both. There are a large number of forms of this species, many of them having crested radiating fronds. Among the best may be mentioned *concinna*, *crispa*, *cristata*, *flabellata*, *multifurcata*, *polydactyla*, *plumosa*, *serrata*, *stricta*, *trinervis*, and *trinervis coronans*.

Culture &c. as above. Suitable for damp shaded parts of the rockery. See also p. 1009.

WOODWARDIA (Chain Fern).—A small genus of beautiful Ferns, with large twice pinnatifid fronds, with linear or linear oblong sori sunk in single rows parallel with and contiguous to the midribs of the pinnæ and pinnules. The indusium is the same shape as the sorus, and closes over the cavity like a lid.

Culture and Propagation. — Woodwardias flourish in sandy loam and peat in moist and shady situations, and may be used with great effect in corners of the rock garden. All the species are exotic and require protection from frost in winter, except perhaps in the milder parts of the south-west of England and Ireland. Increased by spores as described at p. 1009.

W. areolata (*W. angustifolia*) is a native of the United States, having deltoid, ovate, barren fronds 6–12 in. long, borne on slender stalks, and 8–9 or more irregular pairs of oblong lance-shaped, crenate-serrate pinnæ, while the fertile fronds with narrow linear pinnæ are borne on strong erect chestnut-brown stalks.

Culture &c. as above.

W. radicans.—A native of the Canary Islands, S. Europe &c., having graceful fronds 8–6 ft. long and 1–1½ ft. broad, divided into lance-shaped pinnæ often 1 ft. long near the base, and cut down almost to the midrib into finely toothed lance-shaped pinnules. The variety *cristata* has the fronds beautifully and symmetrically crested. This species is rather too tender for the open air except in the mildest parts of the country.

Culture &c. as above.

W. virginica.—A pretty species extending from Canada to Virginia, having oblong lance-shaped fronds 12–18 in. long and 6–9 in. broad. The linear lance-shaped pinnæ are 4–6 in. long, cut almost to the midrib into blunt linear oblong or ovate lobes.

Culture &c. as above.

SCOLOPENDRIUM (Hart's Tongue).—The Common Hart's Tongue Fern (*S. vulgare*) is one of the most decorative of hardy Ferns. The typical form has short stout rootstocks, and tufts of simple undivided bright green leathery strap-shaped fronds 6–18 in. long, with linear and parallel rows of spore-cases, covered with a linear membranous indusium, almost at right angles to the midrib. Almost innumerable varieties—perhaps 1000-2000—of the Common Hart's Tongue are now in cultivation, and considerably more than 100 of these have been regarded as first-class garden plants by experts. The variation consists chiefly in the cresting and laceration of the simple fronds into all kinds of shapes, sometimes regular and attractive, sometimes very irregular, and, more curious, without any particular claim to beauty. This wonderful variation may with cultivation and continual production of plants from spores be prolonged indefinitely—so much so, indeed, that it is practically waste of time to give names to any but the most distinct and constant forms. Some of the best known at present are *alato-cristatum*, *angustum*, *capitatum*, *corymbiferum*, *conglomeratum*, *Cowburni*, *crispum*, and several finely divided forms of it, such as *diversifrons*, *grande*, *fimbriatum*, *latum*, *maximum*, *robustum*, *decorum* &c.; *densum*, *grandiceps*, *laceratum*, *marginatum*, *multifidum*, *ramo-cristatum*, *triperaferans* &c.—all names which give an idea as to the character of the variety they represent.

Culture and Propagation. — The Hart's Tongue Ferns are beautiful plants for shady moist parts of the rockery, either growing on level ground or jutting out between the chinks of the rocks. During hot dry summers the beautiful shining green appearance of the fronds may be retained and improved by copious syringings or drenchings with water at eventide. Sandy loam, peat, and leafsoil make an excellent compost for the plants. Failing choicer positions, they will flourish under trees or under a north wall in well-drained soil, but plenty of moisture during the summer is essential to develop luxuriant foliage. See also p. 1009.

ASPLENIUM (Spleenwort). — A genus of Ferns with short tufted rootstocks, simple or compound fronds, and linear or oblong sori, with a membranous indusium opening towards the midrib.

Culture and Propagation. — The Spleenworts flourish in sandy loam, peat, and leafsoil, and may well be grown with such Ericaceous plants as Azaleas, Rhododendrons, Kalmias &c., for which they make a good carpet or border. In partially shaded parts of the rock garden or under tall trees in similar soil they will also grow well. See also p. 1009.

A. Adiantum-nigrum. — The 'Black Maidenhair' Spleenwort is a pretty native Fern, and grows in large tufts in suitable situations. The deltoid-ovate fronds are twice or thrice pinnate, 6–12 in. long, or even 2 ft. including the naked shining chestnut-brown or purple-black stalks. The variety *acutum* is very distinct but rare, and differs from the type principally in having more decidedly triangular fronds with very sharp, almost bristly pointed pinnules. Other forms are *grandiceps* and *microdon*; the latter have broad pinnæ like those of the Sea Spleenwort (*A. marinum*).

Culture &c. as above. Suitable for the rockery or banks in sandy loam and peat, often forming beautiful tufts in moist shaded situations. See also p. 1009.

A. Ceterach (*Ceterach officinarum*).—*Scaly Spleenwort.*—A beautiful native hardy Fern, with pinnately divided fronds rarely exceeding 6 inches long, having bluntly triangular pinnules. They have short scaly stalks, and the upper surface is of a deep green, while the under surface is densely covered with rusty brown scales, which at first conceal the spore-cases.

Culture and Propagation.—This species flourishes in the crevices of rocks or walls in sandy loam and peat, and is adapted for the rockery in shaded parts. It is somewhat difficult to establish at first, and is best moved in spring. There are a few forms known—*crenatum*, and *multifido-cristatum*, which have the pinnules crenate or crested, being the best. See also p. 1009.

A. Filix-fœmina (*Athyrium Filix-fœmina*).—*Common Lady Fern.*—An elegant native Fern with a stout root-stock from which spring tufts of large delicate green oblong-lance-shaped fronds 2–3 times pinnate, and 1–5 ft. long, with stout brown or pale yellow stalks very scaly at the base. The indusium differs from that of other Spleenworts in being more or less curved or kidney-shaped and fringed with bristles on the margin. The variety *molle* has shorter and softer fronds than the type; *latifolium* is a strong-growing variety with larger and more 'leafy' fronds and crowded pinnules deeply toothed at the edges; *incisum* has very large, thrice pinnate fronds with broad pinnæ; *rhæticum* (or *convexum*) has twice pinnate fronds with narrow convex and toothed pinnules.

The garden forms of the Lady Fern are very numerous—more than 100 have been certificated—and some of them may be regarded as the finest hardy Ferns in cultivation, the plumose or crested forms being particularly handsome. Among the best forms mention may be made of *acrocladon*, all the crest forming a ball; *Applebyanum*, very narrow, with a wide-branching crest; *Blakæ*, beautiful plumose form; *clarissimum*, a very beautiful and rare form, said to be reproduced only by means of apospory (see p. 1010); *congestum grandiceps; conioides; corymbiferum*, a fine crested form; *crispum; cristatum; Edwardsi*, a dwarf gem; *excurrens*, with bristly fronds; *Fieldiæ*, a narrow 'cruciate' form; *fæcundolosissimum*, a dwarf form remarkable for producing numerous bulbils in the crest; *Frizelliæ*, in which the pinnæ are contracted into round lobes; *Grantæ*, very fine congested form; *Howardiæ*, laciniate and crested; *kalothrix*, with unique silky fronds; *percristatum*, a fine tasselled form; *plumosum*, feathery; *divaricatum* and forms, one (*dissectum*) being remarkable for having fronds five times pinnate; *revolvens*, known as the 'Prince of Wales' Feather' Fern, in which the fronds and all divisions are symmetrically curled inwards; *rotundato-cristatum*, with pinnules and crests all prettily rounded; *stellatum angustatum*, with very narrow fronds, the lower pairs of pinnæ being star-like; *Vernoniæ*, pretty crisped form; and *Victoriæ*, a charming form with long narrow fronds, and much divided tassels, the pinnæ being arranged crosswise in pairs and beautifully tasselled.

Culture and Propagation.—The Lady Ferns flourish in sheltered shady spots in well-drained sandy peat and loam. Some of the choicer forms are well worthy of special attention and should not be mixed up with the commoner ones. They may be increased by spores as described at p. 1009.

A. fontanum (*A. Halleri*).—The 'Smooth Rock Spleenwort' is a small tufted native species rarely exceeding 3–4 in. high, with narrow lance-shaped twice pinnate fronds, deep green above, paler beneath, and supported on very short stalks having a few narrow-pointed scales at the base. The spore-clusters are distinct, but very often become merged into one another so as to cover nearly the whole under surface of the pinnules.

Culture &c. as above. This species

grows freely in well-drained sandy loam and peat in warm sheltered parts of the rock garden. It may also be grown in pots in cool greenhouses. See also p. 1009.

A. germanicum (*A. alternifolium*).—This is one of the rarest of our native Ferns found growing among the rocks in parts of Wales and N. Britain, forming small tufts 3–6 in. high. The oblong lance-shaped fronds, with blackish stalks, are pinnately divided into a few distant and alternate wedge-shaped pinnæ, the lowest of which are cleft or divided.

Culture &c. as above. This species is rather difficult to establish, but grows fairly well in sandy loam and peat, well-drained, with the addition of brick rubble. Except in sheltered localities this species is apt to die in winter. See also p. 1009.

A. lanceolatum.—A native species about 6–9 in. high, with bright green broadly lance-shaped leaves, twice pinnately cut, and having broad crowded acutely serrate pinnules. The variety *microdon* is a rare plant having pinnate fronds, the pinnæ being wavy and lobed, but not again divided as in the type. The variety *crispatum* is cut like the type, but the margins of the pinnules are curled inwards and sharply toothed.

Culture &c. as above. This species grows on wet rocks in parts of England and S. Ireland, nearly always near the coast, and is very frequently met with in the Channel Islands. It is only fit for the milder parts of the country in warm moist parts of the rockery. See also p. 1009.

A. marinum (*Sea Spleenwort*).—A beautiful tufted native Fern having a stout rootstock clothed with purple-brown chaffy scales, and oblong or lance-shaped leathery fronds, pinnately divided into oblong ovate crenate lobes 1–2 in. long, and borne on stout shining reddish-brown stalks. There are a few forms, *imbricatum*, *coronans*, *mirabile*, *Thompsoni*, and *plumosum*, being among the best.

Culture &c. as above. The Sea Spleenwort is very hardy and may often be seen growing in the chinks of dry old walls, but is then very small and poor. It grows naturally near the sea-cliffs and caves, and is best in warm moist shaded places in parts of the rockery. It is often grown in warm moist greenhouses, when it assumes luxuriant proportions. See also p. 1009.

A. Ruta-muraria (*Wall Rue Spleenwort*).—This is not a particularly handsome species, but may be included in a large collection. It is found throughout the British Islands on walls and rocks, and may be recognised by its oblong or ovate fronds, irregularly twice-pinnate into rounded or truncate-toothed lobes.

Culture &c. as above. It may be grown in well-drained sandy loam and peat between the chinks of large stones in the rock garden. See also p. 1009.

A. septentrionale (*Forked Spleenwort*). A rare little native Fern with a dense tufted habit, and linear lance-shaped long toothed fronds on rather long stalks purple at the base. The sori are at first distinct but become confluent with age.

Culture &c. as above. This species is found growing naturally on rocks and walls, and may be grown in warm moist parts of the rockery in sandy soil mixed with brick rubble. See also p. 1009.

A. Trichomanes (*Maidenhair Spleenwort*).—A dwarf tufted native Fern rendered attractive and easily recognised by its shining blackish or red-brown stalks, and midrib, on each side of which the deep green oblong bluntly toothed or crenate lobes or pinnæ are arranged with great regularity. The fronds are linear in shape, pinnate, and 6–12 in. long. There are several good forms, among which may be mentioned *attenuatum*, *confluens*, *cristatum*, *imbricatum*, *incisum*, *multifidum*, *Maulei*, and *ramosum*.

Culture &c. as above. The true Maidenhair Spleenwort is found growing naturally on rocks, old walls, ruins, and occasionally hedgebanks in most parts of the British Islands. It requires great care in transplanting, as the wiry roots cannot stand much injury. Once established, however, it grows freely in warm moist and somewhat shaded corners of the rockery, and is attractive between the chinks and crevices of rocks where it is not likely to be disturbed. See also p. 1009.

A. viride.—This elegant little British Fern closely resembles *A. Trichomanes* in appearance and habit, but is readily distinguished by the green and not black colour of the rachis or midrib, and by the shorter oblong or ovate crenate lobes of the linear pinnate fronds.

Culture &c. as above. It may be grown like *A. Trichomanes*, but requires more shade and moisture in summer, and less wet in winter. In cold wet seasons it should be protected in the rockery with a sheet of glass. See also p. 1009.

CYSTOPTERIS (BLADDER FERN). A small genus of delicate flaccid Ferns with short or creeping rootstock and tufted or scattered fronds 1–4 times pinnately divided, and having pinnate or forked veins. Sori small roundish, covered with a membranous convex indusium attached to the veinlet below the sorus.

Culture and Propagation. — The Bladder Fern is found in mountainous districts, in moist rocky places, also more rarely on old walls and ruins, and grows freely in the rock garden in moist shady spots, throwing up its graceful fronds in spring and early summer, and retaining them in freshness until cut down by frost. Increased by spores. See also p. 1009.

C. alpina (*C. regia*).—A handsome little Fern closely related to *C. fragilis*, with bright green fronds 4–10 in. long, 3–4 times pinnately divided.

Culture &c. as above. It may be grown like *C. fragilis*, but requires protection from cold drenching rains in winter. See also p. 1009.

C. fragilis.—A charming and elegant native Fern having ovate-lance-shaped fronds 4–8 in. long, pinnately divided into deltoid pinnæ, which are again divided or cut into ovate acute pinnules, more or less deeply toothed on the margins. The variety *dentata* is generally smaller and nearly always blunter in all its parts; *dickieana* is an elegant form, more compact in habit than the type, the pinnæ bending downwards and more or less overlapping.

Culture &c. as above.

C. montana (*Mountain Bladder Fern*). A rare and elegant native species found growing on the wet shady rocks in the mountainous parts of Scotland. The delicate triangular fronds are 4–6 in. long, 3–4 times pinnately divided.

Culture &c. as above. It requires similar treatment in the rockery to *C. fragilis*. See also p. 1009.

ONOCLEA.—A small genus of hardy Ferns having roundish sori on special (fertile) fronds in which the pinnæ have been contracted with or without an indusium.

Culture and Propagation. — These Ferns flourish in moist and cool situations in the rock garden and enjoy a rich strong well-drained sandy loam. Owing to the spore-bearing fronds resembling an unopened spike of flowers this group of Ferns, and also the Osmundas, are popularly called 'flowering' Ferns, but as already explained at p. 1008 they have nothing of the nature of ordinary flowers.

O. germanica (*Struthiopteris germanica*). —*Ostrich Fern.*—A handsome species native of the northern hemisphere, but not of the British Islands. It has broadly lance-shaped fronds, tapering towards the base, the fertile pinnæ being roundish linear, lobed and torn at the edges.

Culture &c. as above. See also p. 1009.

O. sensibilis. — A pretty Fern from North America and W. Asia, with a widely creeping rootstock. The fertile fronds are twice pinnate with roundish somewhat recurved pinnules, while the barren fronds are broadly triangular in outline and deeply and pinnately cut into lance-shaped oblong pinnæ, entire or wavy toothed on the margins. This species has been found wild near Warrington, but is considered not to be a true native of England.

Culture &c. as above. See also p. 1009.

WOODSIA. — A genus of dwarf tufted Ferns with pinnate fronds, the stalks of which are usually jointed above the base. Sori roundish; indusium attached under the sorus, at first cup-shaped and entire, afterwards splitting into thread-like segments.

Culture and Propagation.—Woodsias flourish in rich sandy loam and peat, with which may be mixed some ground sandstone or brick rubble to keep the soil thoroughly open and well drained. Very moist and well-shaded parts of the rockery suit them best, and the plants may be inserted between the chinks of large stones or boulders to give the best effect in accordance with their natural growth. They may be increased by spores and division of the rootstock in early spring just as the new fronds are about to grow.

W. hyperborea (*W. alpina*). — An interesting hardy Fern found on wet alpine rocks in N. Wales, Scotland, and throughout the N. temperate hemisphere. The densely tufted lance-shaped fronds 3–6 in. long, with shining stalks clothed at the base with rusty scales, are pinnately divided into ovate-oblong or somewhat heart-shaped pinnæ, which have forked and simple veins and downy or hairy margins and surfaces.

Culture &c. as above. This Fern flourishes in moist shady spots and may be used in nooks in the rockery. See also p. 1009.

W. ilvensis. — This is practically a variety of *W. hyperborea* but is usually kept distinct for garden purposes. It differs in having the fronds more broadly lance-shaped in outline, and the pinnæ deeply cut into oblong and rather crenate lobes.

Culture &c. as above. See also p. 1009.

W. obtusa (*W. perriniana*). — An American species extending along the mountains from the United States to Peru, and hardy enough for mild parts of our climate. The oblong lance-shaped fronds, 6–9 in. long, are twice or thrice pinnately cut or divided into oblong, blunt, somewhat crenate pinnules, but are not jointed with the stalk. The plants grow in slender tufts and are very graceful.

Culture &c. as above. See also p. 1009.

ASPIDIUM (Shield Fern).—A genus of tufted evergreen Ferns with pinnate fronds and round sori, covered with a round shield-like indusium. The plants commonly known as Polystichums are now included with the Shield Ferns.

Culture and Propagation. — The Hardy Shield Ferns are among the most ornamental plants for the outdoor garden. They are strong and free-growing and most of them require little attention after they are once established in suitable places. They prefer shaded places under tall trees, nooks in the rockery, or among Ericaceous shrubs, such as Rhododendrons, Azaleas, Kalmias &c. During the summer months they require plenty of moisture, but the soil in which they are growing—consisting of sandy loam, peat, and leaf-mould—must be well drained, as with other Ferns. Most kinds of Aspidium may be easily increased from spores, and by division of the rootstocks in spring.

A. aculeatum (*Polystichum aculeatum*).—*Prickly Shield Fern.*—A sturdy native Fern with broadly ovate lance-shaped fronds about 2 ft. long, rather harsh and rigid in texture, the upper surface deep green and shining, and the short stalks clothed with rusty pointed scales. The fronds are twice pinnate, the alternate pinnæ being again more or less deeply divided into rhomboid-ovoid pinnules with sharp teeth or bristles. The variety *lobatum* has narrower twice-pinnate fronds and very rigid more or less decurrent pinnules. The variety *angulare* (*Polystichum angulare*) known as the 'Soft Shield Fern' differs chiefly from the type in having stalked and not sessile pinnules, which are likewise less harsh in texture, and with long pointed teeth.

The garden forms of the Prickly Shield Fern are very numerous, many of them being beautifully crested, lobed, and tasselled. Some of the best known forms are *acrocladon*, crested; *Baileyæ*, with slender pinnules; *brachiato-cristatum*, with fronds forming a crested trident; *congestum*, very dwarf and tufted; *crispato-foliosum*, dense and pretty; *cristatum*, finely tasselled; *decompositum*; *divisilobum cristatum*, deeply divided and crested; *d. plumosum densum* and *d. p. laxum*—two charming feathered forms rivalling *Todea superba* in effect; *grandiceps*, tasselled; *parvissimum*, a densely congested form with fronds 12–18 in. long; *Pateyi*, a wild feathered form; *polydactylum*, beautiful fingered divisions; *pulcherrimum*, a splendid feathered variety with barren fronds; *setosum*, a finely cut bristly form; *tripinnatum*, a fine and much divided form.

Culture &c. as above. See also p. 1009.

A. Lonchitis (*Polystichum Lonchitis*). *Alpine Shield* or *Holly Fern.*—A stiffish prickly looking native species with dense tufts of linear oblong pinnate fronds, 6–18 in. long, bright green above, and scaly at the base of the short stalks. The narrow ovate pinnæ are ½–1 in. long with sharply toothed or spiny edges and tips, and sori in 2–3 rows on each side of the midrib. The Holly Fern, which is found on the rocks at an elevation of over 3000 ft. in the Highlands of Scotland, is somewhat difficult to transplant successfully. Plants for the garden would probably be better raised from spores and then planted when young in sheltered shady niches of the rockery. The variety *cristatum* is a crested form.

Other species of Aspidium not so well known but worthy of a place with the others are *A. acrostichoides* from N. America, with fronds 1–2 ft. long, and *A. munitum*, a fine Californian species with fronds 1–2 ft. long and 4–8 in. broad. These are best in warm sheltered shady nooks in the milder parts of the country.

Culture &c. as above. See also p. 1009.

NEPHRODIUM (BUCKLER FERN). This genus is closely related to Aspidium, from which however it may be readily distinguished by the kidney-shaped (not roundish) indusium which is attached by the sinus and not the centre. All the British Buckler Ferns are probably better known in gardens under the name of *Lastrea*, which has now been discarded by the best botanical authorities.

Culture and Propagation.—The cultivation of the Buckler Ferns is practically the same as for the Shield Ferns (*Aspidium*), and they grow well together under the same conditions. A good compost of sandy loam, peat and leaf mould suits them well, and during the summer they like an abundance of moisture. See also p. 1009.

N. æmulum (*Lastrea æmula*).—*Hay-scented Buckler Fern.* — An elegant Scottish and Irish Fern closely related to *N. spinulosum*, but with more triangular and divided fronds remarkably concave and curved upwards, and possessing a crisped appearance from the recurving edges of the segments. There is a crested form known as *cristatum*.

Culture &c. as above. This species flourishes in damp sheltered places and is suitable for moist shady banks and between large stones in the rockery. See also p. 1009.

N. cristatum.—A rare native species with oblong lance-shaped fronds about 18 in. long, pinnately divided, the shortly stalked pinnæ having short teeth.

Culture &c. as above. This species grows in bogs and marshes in a few places, and may be grown in damp shady banks or rockwork in peaty soil, with plenty of water in summer. See also p. 1009.

N. dilatatum (*Lastrea dilatata*). *Broad Buckler Fern.*—This well-known hardy Fern is closely related to *N. spinulosum*, and is indeed only a form of it. It has however larger fronds ovate lance shaped in outline, twice or thrice pinnate, and more deeply cut. There are several fine forms of it including *cristatum*, *crispum*, *folioso-digitatum*, *folioso-grandiceps*, *polydactylum*, *ramosum* &c.

Culture &c. as above. See also p. 1009.

N. Filix-Mas (*Lastrea* and *Aspidium Filix-Mas*).—*Male Buckler Fern.*—The native Fern receives its name from its robust appearance in contrast with the more delicate though similar 'Lady Fern' (*Asplenium Filix-fœmina*). Its beautiful 1–2 pinnate fronds are 1–3 ft. long, springing from a short thick rootstock, and are oblong lance-shaped in outline, rather rigid in texture, with oblong pinnules more or less toothed. There are several natural forms of this species, the best known being *abbreviatum*, in which the pinnæ are pinnatifid or bluntly crenate oblong with only one row of sori along the midrib; *affine* (or *incisum*), with oblong lance-shaped deeply cut pinnules; and *Borreri* (or *paleaceum*), with bright golden-yellow fronds and obtuse almost truncate and less serrate pinnules. The garden forms are also numerous, and include *Barnesi* (or *curtum*), with rather narrow fronds; *Bollandiæ*, a feathered form; *cristatum*, a curious and handsome crested form; *fluctuosum*, a pretty crisped form; *grandiceps*, feathery; *lux-lunæ*, the fronds of which become whitish when grown in sunshine, besides many others.

Culture &c. as above. See also p. 1009.

N. Oreopteris (*N. montanum*).—An elegant native species often called the 'Mountain Buckler Fern' owing to its being found among the mountainous heaths and pastures, often at an elevation of 3000 ft., in the Highlands. It has a fragrant smell when drawn through the hands, and sends up tufts of lance-shaped pinnate fronds 1½–3 ft. long, the pinnæ being deeply pinnatifid and glandular beneath. It is a fine Fern for shady parts of the rockery or border, and likes plenty of moisture in summer. There are several handsome forms of it known, such as *Barnesi*, *congestum*, *coronans*, *cristatum*, *cristatum gracile*, prettily tasselled; *grandiceps*, *nowellianum*, a curious but rather pretty irregular form; and *truncatum*, the pinnæ of which end abruptly with projecting horns.

Culture &c. as above. See also p. 1009.

N. rigidum (*Lastrea* and *Aspidium rigidum*).—An elegant British Fern of upright or spreading habit, having oblong lance-shaped fronds 1–2 ft. high, issuing from the crown of a comparatively thick rootstock in spring, and shrivelling upon the approach of winter. The rhomboid pinnæ are divided into acutely toothed pinnules which are somewhat glandular beneath, and emit a faint and more or less agreeable odour when passed through the hand.

Culture &c. as above. A free grower in the rockery in shady places. See also p. 1009.

N. spinulosum.—This species is probably better known through its variety *dilatatum*, which has already been referred to separately. It has a tufted rootstock from which oblong lance-shaped fronds 1–2 ft. long are produced having pinnæ 2–4 in. long and pinnatifid pinnules with oblong more or less spiny-toothed lobes. *N. remotum* is a distinct variety found in the Lake District, having lance-shaped pinnæ.

Culture &c. as above. This species and its forms flourish in damp shaded places and are useful under trees, or nooks in the rock garden. See also p. 1009.

N. Thelypteris (*Lastrea* and *Aspidium Thelypteris*).—*Marsh Buckler Fern.*—A graceful native Fern with an extensively creeping rootstock from which the lance-shaped pinnate fronds spring about May on slender straw-coloured stalks. They are about 2 ft. long, of a delicate pale green, with opposite deeply cut pinnæ, the lobes of which are curved in on the margins.

Culture &c. as above. This species likes boggy soil and shaded places, and, owing to the creeping character of its rootstocks, requires plenty of space to develop. See also p. 1009.

Besides the hardy British sorts of Buckler Fern, there are a few exotic ones that may also be grown like them out of doors, such as *erythrosorum* from China and Japan; *floridanum* from the United States; *fragrans* from the Caucasus and Arctic America; and *goldieanum marginale* and *novaboracense* from N. America.

POLYPODIUM (POLYPODY).—The plants belonging to this genus are readily recognised by their round naked sori, quite destitute of an indusium or involucre. They usually have creeping or tufted rootstocks and simple lobed, pinnatifid, or pinnate fronds. About 400 species belong to this genus, but only a few are hardy in the United Kingdom.

P. alpestre (*Aspidium* and *Athyrium alpestre*).—At first sight this pretty native Fern might be mistaken for the Common Lady Fern (*Asplenium Filix-fœmina*), so closely do the fronds resemble each other in appearance. It has stout scaly rootstocks from which the twice pinnate oblong lance-shaped fronds about 2 ft. long appear in May and last till cut down by the frost.

Culture and Propagation.—This species is found at high elevations in Scotland under the shade of rocks near streams &c. It requires a damp peaty soil in cool shady parts of the rockery. Increased by spores or division. See also p. 1009.

P. Dryopteris (*Oak Fern*).—This native species is readily distinguished from other Polypodies by having its fronds smooth and divided into three branches, each bearing 6–8 or more pairs of pinnules which are deeply pinnatifid into bluntish crenate lobes. The whole plant is slender and delicate in habit, and not often exceeds 6 in. high. It flourishes in a cool shady situation in the rock garden in well-drained sandy loam and peat, and loses its fronds in winter. The 'Limestone Polypody,' *P. robertianum* (or *P. calcareum*), is a variety of the Oak Fern, having a stouter rootstock, and more feathery glandular downy fronds.

Culture &c. as above. It may be grown among pieces of limestone rubble in shaded parts of the rockery, and does not need so much moisture in summer as most hardy Ferns. See also p. 1009.

P. Phegopteris (*Beech Fern*).—A somewhat fragile species found in damp shaded places in various parts of the British Islands. It has creeping rootstocks and throws up delicate hairy pale green fronds about May. They are 6–12 in. long when fully grown, having 9 or more pairs of more or less deeply divided pinnæ usually standing opposite each other.

Culture &c. as above. This species likes warm sheltered spots in the rockery with plenty of shade and moisture in summer. Its frail fronds are cut down by the frosts in winter, and serve to protect the roots from frost and wet, and should therefore not be cut away till spring.

P. vulgare (*Common Polypody*).—This is an evergreen native species found growing freely on old tree trunks, mossy banks, moist rocks and walls &c. in various parts of the British Islands. It is readily distinguished from other species by its densely scaly rhizomes which creep on the surface of the soil, and the alternate linear oblong fronds 6–12 in. long, pinnately cut into linear oblong entire or crenate-serrate segments. They are deep green and leathery in texture, the under surface having lines of golden spore-cases which look very handsome and conspicuous. There are many forms of the Common Polypody, among which may be noted, *cambricum*, a fine feathered form; *cornubiense* (or *elegantissimum*), *cristatum*, *glomeratum*, *grandiceps*, with heaving terminal and lateral crests to the fronds; *multifido-cristatum*, all crested; *omnilacerum*, *plumosum*, *Prestoni*, a pretty congested form of *cambricum; pulcherrimum*, *ramosum*, *semi-lacerum*, and *trichomanoides*, a handsome form in the way of *cornubiense.*

Culture and Propagation.—The common Polypody and its varieties flourish in rich sandy loam and peat with plenty of leaf-soil, and are very useful for planting beneath trees or on and around old tree-stumps. Indeed they may be placed in a variety of situations—moist rocks, walls, mossy banks, old ruins &c., and as long as they are given plenty of water in summer they require little attention. Some of the garden varieties mentioned above require a little more care perhaps in their cultivation, otherwise they may be found to revert to some of the commoner forms. When only a plant or two of a fine variety exist, it is safer to grow them in pots in cold frames or greenhouses until the increase of stock will permit them to be planted in the outdoor garden. See also p. 1009.

Among exotic species hardy enough for outdoor cultivation in favourable parts of the country may be mentioned the N. American *P. hexagonopterum*, with fronds 8–12 in. long, and *P. Lingua*, from N. India, Japan &c., easily recognised by its leathery strap-shaped fronds covered with a rusty tomentum beneath.

GYMNOGRAMME. — This genus contains mostly tropical species, among them being the well-known Gold and Silver Ferns grown in hothouses. *G. leptophylla* is scarcely worth growing, but is interesting as being one of the few annual Ferns known. It is found chiefly in Jersey on moist banks, and requires to be raised from spores sown every autumn under glass, or in warm sheltered places in the south of England and Ireland. They will produce mature Ferns the following year, each plant consisting of a tuft of about half a dozen fronds, the largest of which are about 6 in. long, and bear spores. They are very slender and broadly ovate oblong in outline, and twice or thrice pinnate.

Tribe II. HYMENOPHYLLEÆ.—Rootstock creeping. Fronds very delicate and almost transparent, net-veined, circinate in vernation. Indusium 2-valved, urn-shaped or 2-lipped. Spore-cases sessile on a club-shaped or thread-like receptacle surrounded with a complete oblique or transverse ring.

HYMENOPHYLLUM (FILMY FERN).—A genus of delicate ferns with creeping thread-like rootstocks and pellucid fronds and marginal sori, with the indusium free or sunk in the midrib.

H. tunbridgense. — A pretty native Filmy Fern growing in matted tufts on the surface of damp rocks in moist sheltered localities. Its membranous fronds are 3–6 in. long, and of a dull brownish-green when fresh. They are pinnate with once or twice pinnatifid segments.

Culture and Propagation.—Perpetual shade and moisture are the main things required for Filmy Ferns—which include the Hymenophyllums and Trichomanes, and it is practically impossible to find a suitable situation for these out of doors. If any grotto or other place can be devised where frost can be excluded in winter, and the temperature ranges from 40° to 50° Fahr. throughout the year, and the atmosphere can be kept close and thoroughly saturated with moisture, there it is possible to grow Filmy Ferns. A small glass case with a few pieces of rock stuck up here and there in the sandy peaty soil may be used to grow these plants successfully if the other conditions are kept. Provision should be made so that no stagnant moisture will remain about the plants, but care must be taken to avoid draughts of dry air which speedily shrivel the delicate fronds.

H. unilaterale (*H. Wilsoni*).—Also a native species found growing under similar conditions to *H. tunbridgense*. It is a small moss-like plant with a mass of semi-drooping brownish-green semi-transparent fronds, oblong lance-shaped in form, and pinnately divided, the pinnules being decurved and spiny serrate.

Culture &c. as above.

TRICHOMANES (Bristle or Killarney Fern).—*T. radicans* is the best known plant of this genus. It is now almost exclusively confined to the lakes of Killarney in a wild state, where it forms luxuriant masses amid the dripping rocks over which its membranous semi-transparent fronds hang in clusters. It is so beautiful that it should if possible be grown in specially adapted quarters in the garden.

Tribe III. Osmundeæ.—Fronds leathery or membranous, circinate in vernation. Indusium absent. Spore-cases clustered in a branched panicle terminating the frond, vertically 2-valved, and furnished with a short horizontal ring.

OSMUNDA (Royal Fern).—A genus of Ferns with tuberous, densely branched rootstocks, and tufts of leathery fronds once or twice pinnate. Some of the pinnæ are altered, contracted, and covered with naked confluent sori.

Culture and Propagation. — The Osmundas form another group of the so-called 'flowering' Ferns, and constitute a very ornamental class of plants. They flourish in marshy or boggy soil composed of peat and sandy loam, and are very effective near the margins of ponds, lakes &c. in shaded or sunny situations where they can obtain plenty of moisture. They may be increased by spores, as described at p. 1009, or division.

O. cinnamomea.—A graceful N. American and Japanese species, having simply pinnate barren fronds 2–3 ft. high and 6-8 in. broad, on stalks 12–18 in. long, the strap-shaped pinnæ being closely arranged and cut down nearly to the midrib. The fertile fronds are much smaller. The form known as *angustata* is dwarfer than the type, and the fronds are smaller in all their parts.

Culture &c. as above.

O. claytoniana (*O. interrupta*). — A splendid species, native of N. America and the Himalayas. It grows only 1½–2 ft. high, and is clothed with a rusty down or fur when young, the barren and fertile pinnæ being intermixed.

Culture &c. as above. All the above Ferns lose their leaves in winter, but it is safer to allow the withered mass to remain until spring as a protection from frost.

O. regalis. — A stately British Fern, often producing fronds 6–8 ft. or more high, on stout brown stalks, in spring. The barren pinnæ are bluntly oblong in shape and 8–12 inches in length, more or less unequally lobed at the base. The upper ones gradually change into cylindrical fertile ones, forming a large panicle of spore-clusters, which looks very handsome. The form called *cristata* has the ends of the fronds and all the pinnæ finely crested; *corymbifera* is curiously forked and crested; and *revolvens* has the edges of the pinnules recurved, giving the plant a distinct appearance. *O. palustris* is a form of the Royal Fern in which the young fronds are reddish in colour and never attain the size of the type.

Culture &c. as above.

Tribe IV. Ophioglosseæ.—Fronds straight in vernation. Spore-cases large, 2-valved, without a ring, arranged in spikes or panicles.

OPHIOGLOSSUM (Adder's Tongue).—*O. vulgatum* is a small stemless Fern, native of the damp pastures, banks, woods &c. of parts of the British Islands. The oblong linear or lance-shaped barren fronds appear about May from a short rootstock, and reach a height of 6–12 in., having a smooth, round, fleshy stalk below. In summer the blade branches into a flattened stalked spike 1–2 in. long, with 2 rows of confluent roundish spore-cases that burst transversely. *O. lusitanicum* is a form with narrow lance-shaped fronds and spikes less than 1 in. long.

Culture and Propagation. — The Adder's Tongue Fern is easily grown in rich, moist, sandy loam and peat in partially shaded parts of the rockery. Increased by spores as described at p. 1009.

BOTRYCHIUM (MOONWORT).—This genus is closely related to Ophioglossum, but differs in having pinnate or twice pinnate fronds and a compound panicle of clustered spore-cases.

B. Lunaria.—A distinct-looking hardy native Fern, found in pastures and grassy banks, often at an elevation of over 2500 ft. in the Highlands of Scotland. It has a pinnate fleshy frond 4–6 in. high, with lunate, crenate, or pinnately cut pinnæ.

Culture and Propagation. — It is somewhat capricious in a cultivated state and should be moved only when fully at rest. It likes a soil composed of peat and sandy loam, and fairly moist and shaded situations where it is not likely to be disturbed for several years. The new fronds spring up annually and perish with the frosts of winter, and as individual plants are not very conspicuous it is advisable to grow several together, otherwise they are apt to be overlooked and crowded out by other plants. Where difficulty is experienced in cultivation outside, the plants may be grown in cold frames until thoroughly established.

CXXXII. EQUISETACEÆ—Horsetail Order

An order containing about 25 species of interesting cryptogamic plants chiefly natives of the North Temperate regions. They have creeping rootstocks, from which spring erect, round, jointed and grooved stems, hollow except at the joints, which end in toothed sheaths, representing leaves. Sometimes branches grow out from these sheaths and are like the main stem but much smaller. The seeds, or, more correctly speaking, the spores, are borne at the ends of the branches in the form of a short conical head or spike. This is made up of a number of stalked shield-like hexagonal scales, on the under surface of which are several wedge-shaped spore-cases. When ripe these spore-cases open down the inner side and release the numerous green spores, which may be easily seen with the aid of a small hand-glass. The spores are furnished with four elastic threads called 'elaters' which assist in their distribution. They are sensitive to moisture and dryness. When moist they coil round the spore, but when dry they straighten out. By breathing on them they close over the spores, and unroll again, as if alive, as soon as they become dry.

EQUISETUM (HORSETAIL; PADDOCK PIPES). — A genus of leafless herbs with erect rush-like stems, hollow except at the joints, and furrowed lengthwise.

Culture and Propagation. — There are 8 or 9 species of Horsetail natives of the British Islands, but those mentioned below are the only ones deserving of any attention from a garden point of view. Indeed some of them are rank weeds and spread so rapidly once they have been introduced into a garden that it is difficult to eradicate them afterwards. They adapt themselves very well to their surroundings, but flourish best in moist loamy soil in shady places such as would suit many Ferns. A clump of the species described below forms an interesting feature in the garden, their distinct appearance and habit of growth reminding one of miniature Pine-tree forests, and being so different from the ordinary run of plants cultivated. The easiest way to increase the Horsetails is by dividing them in autumn when the stems have died down, or in spring when they are starting into growth. But they may also be raised from spores, which should be sown in pots or pans, or even in the open air in warm moist and shady spots much in the same way as recommended for Ferns at p. 1009. Where the plants thrive, however, they will continue to increase naturally by means of their creeping underground stems and also by the self-sown spores.

E. maximum (*E. Telmateia*).—*Giant Horsetail.* — A graceful British plant, 3–6 ft. high, the barren stems being taller than the fertile ones, much grooved and furnished with whorls of slender more or less erect or spreading branches which are sometimes again branched. The main stems are about ½ in. in diameter at the base and gracefully taper upwards. The fleshy fertile (or spore-bearing) stems are about 1 ft. high, pale brown and smooth. From each of the joints arises a large loose funnel-shaped sheath, the upper ones being largest, distinctly striated, and ending in 30–40 long slender teeth. The fruit cones are 2–3 in. long and terminate the stems.

Culture &c. as above. This is rather a common plant and is found wild in bogs and ditches in various parts of the United Kingdom. When well grown in shady places in damp loamy soil, it assumes luxuriant proportions and is a really elegant plant. It may be grown in parts of the bog garden or in moist spots among Ferns in shady places. It may be increased by division and also by spores.

E. sylvaticum (*Wood Horsetail*). — An extremely elegant plant, much shorter than *E. maximum*, the grooved or nearly smooth stems attaining a height of only 1–2 ft. and being furnished with recurved or deflexed branches arranged in whorls or circles at the joints, each branch again having whorls of smaller branches at the joints.

Culture &c. as above.

CXXXIII. LYCOPODIACEÆ—Clubmoss Order

A rather large order of Cryptogamous plants with more or less creeping or sometimes corm-like rootstocks. The rigid stems are usually forked—or dichotomously branched, and furnished with leaves throughout. The simple nerveless or 1-nerved leaves are arranged on the stems overlapping each other in from 2 to 6 ranks. In the axils of some of the leaves which are specially modified the stalkless spore-cases are produced, and are roundish or kidney-shaped bodies opening round the top into two valves and distributing a large number of fine yellow powdery-like spores.

There are 5 species of Clubmoss native of the British Islands, but they may be regarded as valueless for garden purposes. The 'Ground Pine' of North America, however, as *Lycopodium dendroideum* is called, is a pretty and distinct plant with erect and much-branched stems 6–9 in. high, clothed with numerous small bright shining green leaves. The fruiting branches bear long yellow cylindrical spikes of spore-cases.

Culture and Propagation.—This little plant, which resembles a miniature Spruce Fir or 'Christmas Tree' in appearance, flourishes in moist peaty soil in warm sunny positions, and looks very attractive in nooks at the base of the rockery. It is somewhat difficult to increase, but spores may be sown in damp peaty soil in shady places or in small pots or pans. When established in the latter it may be advisable to plant them out carefully in clumps and keep them shaded and moist for some time until they have recovered from the shock of moving.

CALENDAR OF WORK TO BE DONE IN THE HARDY FLOWER GARDEN FROM JANUARY TO DECEMBER

JANUARY

Laurels (p. 360).—The round-leaved Cherry and Portugal Laurels may be trimmed up where the growth has become too dense.

Lawns (p. 113).—These should be rolled occasionally except in very wet weather.

Montbretias (p. 946) and other bulbous plants may be mulched with well-rotted manure, or the beds may be covered with coconut fibre if not already done.

Pæonies may be mulched as advised at p. 165.

Roses (p. 382).—Where a hotbed or warm greenhouse exists Roses may be budded or grafted and kept in a close moist atmosphere for some time.

FEBRUARY

Anemones (p. 140).—At the end of the month Poppy Anemones may be planted if the weather is mild and open.

Annuals (p. 78).—Tender annuals and other plants treated as such (e.g. *Ageratum*, p. 493, *China Asters*, p. 499, *Fibrous Begonias*, p. 462, *Cockscombs*, p. 762, *Golden Feather*, p. 536, *Lobelia*, p. 556, *Petunia*, p. 667, *Phlox Drummondi*, p. 660, *Tobacco*, p. 695, *Bedding Solanums*, p. 669, *Wigandias*, p. 669, *Ricinus*, p. 784, &c.) may be sown in gentle heat.

Bedding Plants.—At the end of the month it will be necessary to insert cuttings of *Lobelias* (p. 556), *Alternantheras* (p. 763), *Iresines* (p. 764), *Fuchsias* (p. 455), *Zonal Pelargoniums* (p. 289), *Heliotropes* (p. 670), &c. in a hotbed, to pot them up when rooted. Sow seeds of Petunias (p. 697).

Borders (p. 80). — About the end of the month, when many bulbous plants (see p. 95) will be showing through the ground, the borders may be forked over and all the leaves buried beneath the surface.

Layering (p. 59).—When forking over the borders the lower branches of desirable shrubs may be layered in the way recommended.

Pruning (p. 105).—Hardy climbers, as mentioned at p. 89, may be looked over and thinned out, but care must be taken to treat them according to their nature.

Sweet Peas (p. 348).—Seeds may be sown in pots in cold frames or on hotbeds for planting out when weather permits.

MARCH

Annuals.—Seeds of most of the Annuals mentioned at p. 78 may now be sown.

Bedding Plants.—Cuttings of all kinds may be inserted in light sandy soil on hotbeds.

Begonias (p. 462). — The tuberous kinds may be started into growth in gentle heat and moisture.

Cannas (p. 885).—The rootstocks may be divided and started into growth in heat and moisture.

Dahlias (p. 519).—The tubers may be placed in gentle heat and kept moist to produce cuttings. The latter may be rooted as advised at p. 521.

Everlasting Peas (p. 347).—These may be divided if more plants are required.

Forced Bulbs.—Any Tulips, Hyacinths, Daffodils &c. that have been forced in greenhouses may be planted out in the borders at the end of the month for flowering a couple of seasons later on.

Pansies and Violas (p. 233).—These may be planted out in beds and borders in rich soil to form a groundwork for various Bedding Plants later on.

Roses (p. 382).—Plants growing on a south border may be pruned (see p. 384), those in other parts of the garden being attended to near the end of the month.

Shrubs (p. 104).—The evergreen kinds may be looked over and any old or dead wood cut out. A list is given at p. 111.

APRIL

Annuals and Biennials.—The kinds mentioned at p. 78 may be sown in the open border in more or less large patches to produce an effect later on. Those sown the previous month in heat will require pricking out.

Antirrhinum (Snapdragons) (p. 710).—Plant out cuttings rooted in cold frames in autumn like *Pentstemons*.

Bedding Plants.—Pot off seedling *Verbenas*, *Petunias*, *Begonias* &c. Many kinds may be shifted to cold frames near the end of the month to be hardened off.

Climbers (p. 89).—Sow seeds of climbing *Tropæolums* (Nasturtiums) (p. 290), *Ipomæas* (p. 683).

Dahlias (p. 519).—The ground for these should be well dug and manured.

Gladioli (p. 947).—Plant corms *gandavensis*, *Childsi*, *brenchleyensis*, and *nanceianus*.

Grasses, Ornamental (p. 956).—Sow seeds in the open ground.

Hardy Herbaceous Plants (p. 80).—Many kinds mentioned on p. 86 may be divided and re-arranged.

Hollyhocks (p. 272).—Prepare ground for these by digging and manuring.

Pentstemons (p. 712).—Cuttings which have been rooted in cold frames in autumn may be planted out in mild weather.

Rock garden (p. 96).—All weeds should be eradicated, and a mulching of well-decomposed manure given to any clumps of strong-growing plants that will need it to flower well.

Roses (p. 382).—A good mulching of manure will benefit the plants.

Violets (p. 230).—Rooted cuttings from cold frames may be planted out during the month in mild weather.

Weeding.—All flower borders should have the hoe freely used to keep down weeds.

MAY

Annuals (p. 78).—Hardy Annuals sown in the open may be thinned out about 6 in. apart. Stocks and Asters may be planted out at the end of the month.

Bedding Plants.—These should be hardened off with as much light and air as possible, and at the end of the month the hardiest may be planted out if the weather is favourable.

Cannas (p. 885).—Harden off foliage by full exposure to sun during daytime.

Castor-Oil Plants (*Ricinus*, p. 784).—Harden off by full exposure to sun during daytime.

Clematis (p. 131) and other creepers.—Attend to tying up on walls, trellises &c. to prevent the growths entangling.

Dahlias (p. 519).—Plant out at the end of the month if the weather is favourable.

Daisies (p. 498).—Plant in shady borders or where required.

Gladioli (p. 947).—Corms may still be planted.

Hollyhocks (p. 272).—Transplant seedlings from autumn-sown seed and also any plants wintered in cold frames.

Primroses (p. 617).—Plant in moist shady places.

Pruning (p. 105).—*Forsythias* (p. 637), *Lilacs* (p. 638), and *Flowering Currants* (*Ribes*, p. 437) may be pruned after blooming.

Roses (p. 382).—Attend to the staking of Standards, and syringe any affected with greenfly with soft soap and tobacco juice. Keep a watch for maggots and destroy by hand. Liquid manure may be given to beds of Roses on grass once or twice a week.

Sweet Peas (p. 348).—Seeds may be sown outside for a succession.

JUNE

Bedding-Plants.—Finish planting out.

Begonias (p. 462).—The tuberous- and fibrous-rooted varieties may be planted out to produce a fine effect later on.

Callistephus hortensis (p. 499).—Plant out in beds in open sunny places for effect. The florist's China Aster has been derived from this species and may also be planted out.

Foliage Plants (p. 117).—*Cannas* (p. 885), *Musas* (p. 888), *Solanums* (p. 687), *Wigandias* (p. 669), *Variegated Maize* (p. 964), *Castor-Oil Plants* (p. 784), *Melianthus* (p. 317) &c. may be planted out for effect.

Polyanthus (p. 620).—Sow seeds in cool border.

Roses (p. 382).—Give liquid manure occasionally to assist flowering, and thin out buds where necessary. Look after caterpillars in the leaves and destroy by hand. Thin out weak shoots and suppress suckers.

Staking.—Tall plants like *Hollyhocks* (p. 272), *Dahlias* (p. 519), *Delphiniums* (p. 158) &c. may require staking.

Violas or Tufted Pansies (p. 233).—A top-dressing of fresh soil and well-decayed manure will assist these and prolong the flowering period.

JULY

Budding (p. 58).—Roses may be budded in showery weather.

Brompton and Intermediate Stocks (p. 202).—Sow seeds in the open border.

Carnations (p. 240).—Layering may be commenced about the middle of the month.

China Asters (p. 499).—These will be benefited by a mulch of well-decayed cow manure.

Hollyhocks (p. 272).—Cuttings of the side and basal shoots of choice varieties may be inserted in a cold frame, as they are not likely to come true from seeds.

Ivy (p. 471).—Cuttings of choice varieties may be inserted in sandy soil in cold frames or under handlights.

Lifting Bulbs.—*Tulips* (p. 860) and *Narcissi* (p. 898) may be lifted if necessary and spread out to dry.

Pegging down.—Peg down the stems of *Verbena*, *Heliotropes*, *Bush Roses*.

Silene compacta (p. 251).—Sow seeds to produce plants for spring bedding.

Snapdragons (*Antirrhinums*, p. 710).—Sow seeds in the open border.

AUGUST

Annuals and Biennials (p. 78).—Seeds of most of the hardy kinds to flower early next year may be sown.

Bedding Plants.—Insert cuttings of *Geraniums* and other plants.

Carnations (p. 240).—Water layers when necessary. Cuttings may be inserted in sandy soil in cold frames and kept close for a time except for a short time early in the morning.

Dahlias (p. 519).—Thin out weak growths and tie up strong ones. Mulch and water the beds.

Madonna Lily (p. 846).—When necessary to transplant this fine Lily, this is the best month.

Pansies and **Violas** (p. 233).—Seedlings may be pricked out, and cuttings inserted in a shady border.

Phloxes (p. 658) and **Pentstemons** (p. 712). Beds of these will benefit by a good mulching and watering. Cuttings of the non-flowering shoots may be inserted in cold frames.

Polyanthus (p. 620).—Prick out seedlings about 6 in. apart.

Roses (p. 382).—Liquid manure and a slight dressing with guano will encourage good growth and flower for autumn. Examine at intervals during the month. Loosen ties of newly budded plants, and rub off shoots below the budded portion. Remove faded flowers.

Seed-Saving.—From now onwards seeds of many *annuals*, *biennials* (p. 78) and *perennials* (p. 86) will begin to ripen and should be saved.

Trees and Shrubs (p. 104).—Cuttings of the half-ripened shoots of many kinds should be inserted in cold frames.

SEPTEMBER

Hardy Herbaceous Plants (p. 86).—Cuttings of many kinds inserted in cold frames. Many of those past blooming and turning yellow may have the roots divided and replanted. All dead leaves and flowers should be cleared up.

Roses (p. 382).—During the month examine ties of buds and loosen where necessary.

Trees and Shrubs (p. 107).—Insert cuttings in cold frames of kinds required.

OCTOBER

Annuals (p. 78).—Most of these will be over this month, and their places should be taken by summer-sown ones, *Wallflowers* (p. 204), *Silene compacta* (p. 251), *Forget-me-nots* (p. 677), *Daffodils* (p. 893), *Tulips* (p. 860), and other Bulbs (p. 95).

Bedding Plants.—If not already done, take up and place in safety for winter. Begonia tubers should be laid out to dry in a cool airy place. As the beds are cleared fill with bulbs and other spring-flowering plants.

Bulbous Plants (p. 95).—*Daffodils*, *Tulips*, *Hyacinths*, *Crocuses*, *Snowdrops*, *Lilies* &c. may be planted in beds, borders, grassland &c.

Calceolarias (p. 703).—Insert cuttings of the shrubby kinds in cold frames for bedding out next year.

Carnations (p. 240).—Layers may be severed and planted in well-dug and prepared soil.

Dahlias (p. 519).—When the tops are cut down by frost the tubers should be taken and stored away after drying and cleaning.

Daisies (p. 498).—The double red and white varieties may be planted as edgings to beds and borders.

Gladioli (p. 947).—Take up corms, dry, clean, and store away until spring.

Golden Elder (p. 478) and other trees and shrubs (p. 107) may have cuttings inserted in sheltered borders or in cold frames.

Herbaceous borders (p. 80).—These should be re-arranged and replanted for next season if necessary.

Pæonies (p. 165).—The Herbaceous kinds may be divided and replanted in good and well-prepared soil.

Pansies and **Violas** (p. 233).—These may be planted in beds for effect in spring.

Pentstemons (p. 712) and **Phloxes** (p. 658).—Insert cuttings of basal and side shoots in cold frames.

Rock garden (p. 96).—The various plants should be gone over, and dividing and replanting may be done where necessary.

Roses (p. 382).—Insert cuttings of desirable kinds, also of Brier and Manetti Stocks for future budding.

Violets (p. 230).—Plants may be placed in cold frames to flower in winter. *Marie Louise* and *Princess of Wales* are good kinds for this purpose.

NOVEMBER

Leaf soil.—All the old leaves should be collected from all parts of the garden and made into a heap and well drenched with water. They will gradually decay and make fine leaf mould about a year hence.

Roses (p. 382).—This is a good month for planting Roses in mild open weather. The beds should be remodelled if necessary, and groups re-arranged.

Trees and Shrubs (p. 104).—Most of the deciduous and evergreen kinds may be shifted or transplanted. Hardy Bamboos are best moved in early summer.

DECEMBER

Herbaceous borders (p. 80).—These should be cleared up, and a good mulching of well-decayed manure given to the various beds or groups of plants.

Lawns (p. 113).—These should be kept free from leaves and rolled occasionally.

Rubbish.—All rubbish should be collected and burned. The ash refuse may be strewn over the borders or used as a mulch for some groups of plants.

PART III

THE HARDY FRUIT GARDEN

Although the cultivation of Fruit has always been an important feature of British gardening, not only in market gardens but also in private establishments, it has of late years attracted far more serious attention perhaps than at any other period. The tons of imported fruits which find a ready sale and consumption in the British Islands are in themselves sufficient evidence that the fruit industry has been considerably neglected in years past in our own country. And it is now recognised that if it pays growers to send Apples and Pears from America and other distant parts of the world it ought to be at least as remunerative to growers who live within a few miles of the markets, and who have not to meet the heavy charges of packing and carriage which are necessarily a great expense to those who send their fruits hundreds and thousands of miles for sale.

Rather late in the day perhaps it has been recognised that the growing of Hardy Fruits in the British Islands might be carried out on a more extensive scale, and great efforts have been made to show that our climate, notwithstanding its proverbial fickleness, is capable of producing excellent and highly flavoured fruit. These efforts have been highly successful, and cottagers and amateurs in all parts of the kingdom are now taking a keener and more intelligent interest than hitherto in making the land at their disposal more productive. This is of course as it should be, as it is the reverse of economic to buy imported fruit from over the seas, that can easily be procured and cultivated at home.

The amateur grower of fruit however must not be led astray by some of the glowing pictures that have been drawn as to the wealth that can be made by making fruit-growing a commercial undertaking. The impression has gained ground that an amateur has only to plant a few acres with fruit trees, and when the fruit is ripe he has but to send it to market to realise first class prices for his produce. There are many people in the country who fondly imagine that, by sending their sons at great expense to a third-rate garden where a few Apples and Pears are grown not for commercial purposes at all, at the end of a year or two these young men, who probably know nothing of the commercial value of plants, will be fully equipped with all the requisite knowledge to enable them to enter the arena against growers who have been engaged in the culture of fruit from boyhood, and who have had to go through many years of hard practical training before they were able to secure a profitable return for their labours and knowledge.

To grow fruit well requires a good knowledge of the plants cultivated and of everything that is likely to prove useful or injurious to them. It is true that an amateur may grow excellent fruit, in fact quite as well if not better than the professional, owing to natural intelligence and love of the work; but it is quite another matter whether he would be able to make it a paying concern from a business point of view. That well-known novelist the late R. D. Blackmore was an excellent gardener and grew fruit probably as well as any one in the kingdom, but even he had to admit that he could not make it pay. Others however who probably could not write novels, and had no university training, were able to dispose of their produce at more or less remunerative prices. This fact alone shows that a good many other things besides ordinary intelligence are requisite to enable one to grow not only fruit but any other class of plants in such a way that they will command a ready sale.

This work however is not intended to teach fruit-growing for commercial purposes. The amateur takes a keen delight in producing the finest fruits possible, and the commercial aspect of the operation is not often taken into consideration. In the following pages the cultivation of the principal fruits suitable for outdoor cultivation in our climate is detailed with a view to giving the amateur an idea as to the way in which he may secure the best results in the quickest and most economical manner.

Situation.—An ideal fruit garden should be well exposed to the sun from the south and west, and well protected from the north and east winds. A level or slightly undulating surface sloping southwards is usually considered to give the best results. If intersected at good intervals by walls running east and west, so much the better; and if bounded by walls or tall thick hedges all round, the best of shelter is afforded. The walls are also extremely valuable for the cultivation of the more tender kinds of fruit trees that are apt to suffer in open exposed situations. In the spring when frosts often nip the blooms and thus spoil the crop as it is about to set, walls give great protection. I have seen a garden intersected by walls produce immense quantities of fruit, notwithstanding spring frosts, while adjoining gardens unprotected except by low hedges had very meagre crops. Hedges may be composed of Holly, Yew, Privet, Hawthorn, White Poplar, or any other shrub or tree which will make a dense growth so as to serve effectually to break cold and violent winds. Damson and Filbert bushes, where not likely to fall a prey to tramps and schoolboys, make excellent hedges, and also yield valuable crops.

Soil.—The best all-round soil for fruit growing is a rich yellow loam, not too sandy nor too clayey in its nature, but stiffish rather than too light on the whole. The deeper it is the better, and if resting on a gravelly or limestone subsoil, the fertility will be all the greater. A soil which is continually soddened with moisture is useless not only for fruit trees but for most plants, and it must be thoroughly drained and brought into a porous and friable condition before attempting to grow crops upon it. Wet heavy soils are improved by trenching and ridging up, and deep cultivation generally. Care, however, should be taken in these operations not to bring too much of the under soil to the surface for the plants to root in. This under or 'subsoil,' as it is usually termed, although it may contain the elements of plant food to a very fair extent, is unsuitable for the roots because as yet it has not been sufficiently changed by the action of rain, air, heat, cold &c. to yield its food up in a suitable or digestible form. The more, however, the soil is tilled the more food is liberated, and consequently the more fertile the soil becomes. The best soil should always be uppermost to induce the roots to remain near the surface where they will benefit by the rain and mulchings of manure. If too deep they loose these advantages.

Liming the Soil.—A great aid to most heavy soils is the addition of lime in a slaked condition. Lime is not only a great fertilising agent, but is also a great cleanser, as it plays havoc with the numerous pests which infest all badly tilled soils and prey upon their crops. According to the heaviness, stodginess, or stickiness of the soil, from 10 to 20 cwts. per acre of slaked lime in a powdered form may be strewn over the surface as evenly as possible. During the winter is the best period for this operation in order to bring the soil into a friable condition by spring, and also because at this period the various insect pests taking refuge in it are likely to be killed. The roots are also in a dormant condition and not so liable to be injured as when in a growing state.

Liming should not be overdone. A soil already well charged requires a dressing only at long intervals. It is a fairly easy process to test whether a soil contains lime or not. A fair sample taken from various parts of the garden placed in a glass or bowl may have a little muriatic or sulphuric acid or vinegar poured over it. If the liquid bubbles and fizzes, it is a sign that lime or chalk is present; the more vigorous the bubbling the more limy substance present. The absence of the fizzing and bubbling indicates want of lime.

Another simple test for lime is to place portions of the soil into a bowl in distilled or at least well-boiled water. Thoroughly mix, and allow the soil to settle at the bottom. By blowing the breath into the water with a reed or a pipe the water will be turned to a milky whiteness if lime be present, but it will remain more or less clear if absent.

A good way to apply lime is to place it in an unslaked condition in little heaps at regular intervals from each other, covering each heap with soil, and leaving it to slake. When reduced to a fine powdery condition by this process it may be forked over the surface evenly and dug or hoed in.

Manure.—Annual dressings or mulchings of stable manure are very beneficial to fruit crops, if applied after the fruits are well set or later on in June, July, and August, during the hot weather. The roots absorb the manurial matters washed into the soil by the rain, the fruits swell, and come to greater perfection sooner, and the formation of fruit buds for the following season is stimulated. Manurial top-dressings also encourage the roots to keep near the upper surface of the soil, and in this way are an antidote to the downward development of roots into the less fertile portions of the earth.

About October to December the land for fruit crops will be benefited by the application of Basic Slag and Kainit at the rate of 5 or 6 ounces to the square yard, dug or hoed in. Basic Slag is insoluble in water, but undergoes a change in the soil during the winter and yields up a soluble phosphatic food to the roots in spring, with the result that the fruits are ultimately large, well-shaped, and excellent in flavour. Kainit is a potash manure, and must be applied in winter, so as to be available for feeding the roots in spring. In the latter season, about February or March, one or two ounces to the square yard of sulphate of ammonia or superphosphate may be applied either separately or mixed. Nitrate of soda may be applied also at this season, but its action is sooner over than that of sulphate of ammonia. Where very quick results are required, however, nitrate of soda is probably preferable, provided too much is not given at a time. All artificial manures are best given in small quantities, as if overdone the foliage is apt to suffer considerably. An excellent all-round manure for fruit trees is bone-meal. According to the richness or poverty of the soil, from 4 to 8 cwts. per acre or 1–2 lbs. to every 10 sq. yds. may be applied and lightly forked in during the winter months. The action of bone-meal lasts for about a couple of years, and produces fine fruit.

Decayed leaves, road sweepings, wood ashes, soot, and almost all organic waste material may be applied to fruit land with benefit instead of throwing it away. The mowings from lawns, the refuse from chicken-runs, rabbit hutches, and excreta from all kinds of animals if mixed together and well incorporated with soil make an excellent manure for fruit trees. Such collections take some time to bring into a proper condition and should never be used in a fresh unfermented state. It is better to have a part of the garden set apart for refuse of this kind so that the heap can be turned over from time to time and exposed to the action of the atmosphere, especially during frosty weather. In the event of disagreeable odours arising it is a good plan to mix dry soil with the heap. When reduced to a well-decomposed and fertile mass, the manure is available for use on the soil.

At p. 1047 a receipt for canker is given consisting of superphosphate of lime, nitrate of potash, nitrate of soda, and sulphate of lime, and these mixed in the proportions recommended make an excellent all-round manure for fruit crops. Manures in general are dealt with at pp. 69-76.

Pruning Fruit Trees

This is an essential and important operation, and to be performed with advantage requires a certain amount of knowledge of the nature of the plants. Cutting fruit trees and bushes with no particular object in view can scarcely be called pruning. The objects to be arrived at by proper pruning are: (1) to keep the trees or bushes in regular shape, the branches fully exposed to the light and air so that the sap will flow as equally as possible to each of them; (2) to induce fruitfulness and to keep the plants in a good state of annual productiveness; (3) to obtain larger fruits of better quality; and (4) to prolong the life of the individual plant.

Anyone who has observed well-pruned fruit trees and compared them with neglected ones will have noticed the vast difference in the number, size, and flavour of the fruits. By thinning out useless twigs, and cutting back leading shoots, the sap is not diffused over a large area. It is thus confined with good results to fewer branches. The sun and air having free access tend to ripen the wood and enable it to stand the rigours of winter. The time for pruning varies somewhat with different plants, and according to circumstances. As it will be indicated under each group, it need not be further referred to here.

Root-Pruning.—It often happens that fruit trees produce enormous quantities of wood and leaves, but comparatively little or no fruit. This undesirable state of affairs is usually brought about by the rampant growth of the roots beneath the surface. If unchecked they will sooner or later strike downwards into the uncongenial depths of the subsoil, where available food is scarce; canker will set in, and the fruit will become deformed, mildewed, and spotted with fungus diseases.

The object of pruning the roots is to remedy and prevent this happening. When properly performed it induces fertility, cures canker and spot on the fruit, improves the flavour, and reduces the labour of pruning the branches.

About the end of October, while the leaves are still on the tree, is considered the most favourable time for root pruning. It is best to perform only half the operation at one time—leaving the other half until the following year. A trench 3-4 feet from the trunk of the tree is opened. By carefully digging down with a fork to a depth of 18 in. or 2 ft. the main roots will be exposed. Tap roots which strike downwards into the soil must be searched for beneath the trunk and if present removed with a sharp knife or saw, or cut away with a mallet and chisel. The main roots should also be shortened back with a sharp knife. But where only a few exist the pruning should not be so severe as when there are several. All cuts should be made leaving the cut surface facing downwards. In this way it will not form a seat for the wet, which may possibly in some soils cause decay. Many good gardeners, however, object to this practice on the basis that the new roots formed near the cut surface (when underneath) are likely to take a downward instead of a horizontal position, and thus sooner or later result in the same trouble. If the cut is facing upwards they contend it induces the new roots to keep nearer the surface of the soil. The operation of cutting the roots having been performed with the cuts showing either upwards or downwards, the trenches may then be filled in with fresh soil, and this will induce new rootlets to develop before the winter sets in. Should the weather be warm at the time, it is a good plan to trim the branches at the same time, as the mutilated plant cannot stand the strain of too much evaporation from all the foliage.

Root-pruning may be practised on most kinds of fruit trees, whether grown as bushes, pyramids, standards, cordons, espaliers, or against walls. The same principles apply to them all. When the operation has been severe, a mulching of well-rotted manure on the surface of the soil will prove beneficial and assist the new roots to form more quickly.

Planting Fruit Trees

The best time as a rule for planting or transplanting fruit trees and bushes is during the month of November. When this month is inconvenient planting may be performed during the month of February and the first half of March. The soil should be in a dry friable condition and not wet and sticky. More harm than good will be done by planting in wet sticky ground, and the plants are better 'heeled' in with some soil over the roots until the ground and weather are in a favourable state.

A hole somewhat wider than the roots will cover should be opened about a foot deep. The bottom should be broken up with a spade or fork, leaving a mound of finer soil in the centre. The fruit tree or bush is placed upon this after any injured, crooked, or downward roots have been cut away with a sharp knife. The others should be spread out radiating from the stem like the spokes of a wheel so that the soil can easily be worked in between them. As the roots are not all on the same level, the lower ones should be first carefully spread out, and a little soil sprinkled over and in between them; then the next ones, and so on until they are all properly disposed. A gentle shake of the tree now and again during the process will allow the soil to settle in between the roots and rootlets and serve to make them fast.

When planted, the soil should be trodden down gently but firmly so as to keep the tree in its place. The soil should be finished off in a slight mound sloping outwards from the stem as it is sure to sink somewhat when it thoroughly settles.

The depth at which a tree is to be planted is usually regulated by keeping the uppermost roots about 4 in. beneath the surface of the soil. Too deep planting is not to be recommended, as the roots are sooner or later likely to descend into the more or less sterile subsoil. At the same time too shallow planting must be avoided, otherwise the tree or bush would become top heavy and wobbling, much to the injury of the rootlets. The accompanying figure will give an idea as to the way in which a fruit tree is to be planted. Newly planted trees should have a stout stake put to them so as to prevent them being blown about by the wind. They should be fastened in such a way that the bark will not chafe against the stake. A piece of india-rubber or a band of hay round the stem will guard against friction.

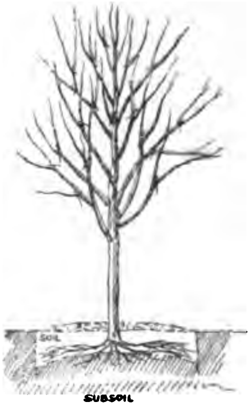

FIG. 186.—PLANTING.

Shortening the Branches. — The branches of newly planted trees should always be cut back more or less according to the variety and the vigour of the plant generally about one-third of their length. Some gardeners object to and condemn this practice, but experience has proved it nevertheless to be beneficial. There are also sound physiological reasons to support it. No matter how carefully a plant is moved a good deal of injury is unavoidably done to the roots. They are further mutilated at planting time when they are trimmed up and shortened as stated above. All this reduces the absorptive power of the root system, and it is therefore impossible for injured roots to support the same number of branches overhead as before they were disturbed, and at the same time develop new ones beneath the surface. If the branches are therefore not cut back so as to lessen the strain upon the injured roots, many of them will die back a certain distance or become so weak with the diminished supply of food that they are useless for fruit-bearing and are a burden to the tree or bush. It is practically useless saturating the soil containing the injured roots in the hope that the branches will be kept plump. The roots cannot absorb the water, and, what is worse, the water may cause decay to set in at their cut ends.

How to prune.—An examination of the branch of any fruit tree will show that the buds upon it are not all upon one side, or opposite each other. They are usually arranged alternately and spirally round the branch, with a greater or less amount of wood intervening between them. The buds also do not point in one particular direction but in many—varying according to the species. All Apples, all Pears, all Plums, Cherries &c. have their buds arranged in the same order upon the branches, and it will be observed that a certain number intervene before one bud comes directly over another in a straight line. The buds being arranged thus, it is an easy matter to make a branch develop in any particular direction by means of intelligent pruning. If, for example, it is required to have a new branch pointing outwards—away from the centre of the tree—the old branch is cut off just above a bud or 'eye' that is pointing in that direction. When growth begins, the 'eye' at that point will produce a shoot in the direction required. If the centre or any other portion of the tree is empty, and a branch is required to fill the gap, the cut is made above a bud which will in due course develop a branch for the purpose.

As a rule, where trees are kept in proper and regular order, the branches are pruned to a bud which points outwards. In this way the centre of the tree does not become crowded and filled with leafy twigs, and every branch and leaf is properly spread to obtain as much benefit as possible from the sun, air, and rain.

In making a cut there is really only one right way of doing it, but several wrong ones. The right and consequently the best kind of cut is one made at an angle of about 45° to the branch on the side *opposite* the bud. The cut should be made quite clean with a sharp knife, and pass out just above the bud, as represented in fig. 187. Care must be taken not to cut too close to the bud, as shown in fig. 188, as it is apt to be rubbed or broken off and leave behind a piece of stubby wood. If the cut is made too far above the bud, a stub or 'snag' is also left, as represented in fig. 189, and is evidence that the pruner did not understand his work or was not sufficiently expert to make the clean cut recommended.

A very bad cut is shown in fig. 140, where a blunt knife or an inexpert hand has 'slivered' the wood into a long drawn out stub. Fig. 141 shows a good cut made from the wrong side of the branch. It should have been cut the opposite way, as shown in fig. 187.

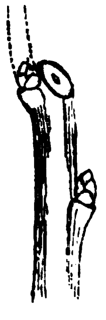

FIG. 137.—CLEAN CUT. GOOD.

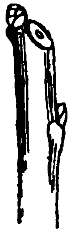

FIG. 138.—CUT TOO CLOSE TO BUD. BAD.

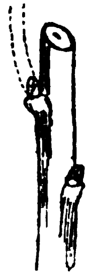

FIG. 139.—SNAG. BAD CUT.

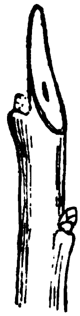

FIG. 140.—BAD CUT.

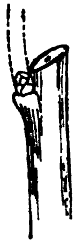

FIG. 141.—CUT IN WRONG DIRECTION.

The great advantage of the clean cut at an angle of 45° just above the bud is that when the new branch develops it looks almost part of the older branch below it. The clean cut also exposes a comparatively small wounded surface which soon heals over, thus lessening the chances of fungoid diseases settling upon it.

The extent and necessity of pruning depend in a great degree upon the vigour or weakness of the plant, and also upon the style in which it is grown. As a general rule, however, it may be stated that weak trees may be pruned more severely than vigorous ones. It is obvious that a weak plant is unable to support as many branches as a strong one—hence the necessity of confining its efforts to the development of a few strong branches that are likely to fruit, rather than allow it to bear a multitude of weak ones which would in all probability produce nothing. The branches of weak trees may be cut back to two or three buds, while those on strong trees may be allowed to carry three or four times as many, according to the vigour of the variety.

When to prune. — The pruning of established fruit trees is practised during the summer and winter months. Summer pruning is an important operation, and if properly performed is of great service in the production of fruit. If practised with too much severity, however, it often results in the development of plenty of leafy branches, but little or no fruit. Some growers pinch out the points of the side shoots back to three or four leaves about the end of May or June. The branches from these are again pinched back later on to two leaves, and in the event of mild wet autumns a third pinching may be necessary. This plan answers well in the case of young vigorous trees. Older trees are weakened too much if pruned so early in the season; they must be allowed to make unrestricted growth until the first week in August, when all shoots not required for extending the size of the tree should be cut back to 4 or 5 fully developed leaves. The result of this treatment is the development of thin weak side shoots which are disposed to form fruit 'spurs,' while the main shoots, having had an extra amount of sap, have become sturdy and strong. Other growers prefer to break the side shoots half way through about the end of June back to three or four leaves from the base, allowing the broken tops to hang loosely. They look rather untidy, but not being quite severed they still absorb a certain amount of sap, and thus prevent the lower buds on the shoots from springing into growth. This treatment usually produces flower-buds on the shoots, and in the case of all trained trees, like espaliers, cordons, and pyramids, may be practised with great advantage. In the autumn or winter, when again pruning, the hanging shoots may be removed with a sharp knife and a clean cut, leaving 3 buds on the remaining side shoots.

About October or November, or later according to circumstances, when the leaves have fallen and the sap is in an almost quiescent condition, the leading shoots of standard pyramid or bush trees may be shortened back to within 6–9 inches or more of their season's growth. It is a comparatively easy matter to trace the amount of growth made each year by fruit trees. The current year's growth is readily distinguished from the growth of the preceding year, and so backwards down the branch, sometimes for four, five, or six years.

If the summer pruning has been properly performed little remains to be done in winter beyond cutting away weak or useless branches that would be likely to overcrowd the tree the following spring, and prevent free access of light and air. All dead wood, of course, should be removed, and whatever form the tree takes should always be borne in mind, so that the branches may be disposed accordingly.

When dealing with stone-fruit trees, like Peaches, Nectarines, and Morello Cherries, pinching out or breaking the shoots in summer is preferable to the free use of the knife in winter. Even Plums and Apricots are all the better for summer pinching and breaking, and are not so liable to be troubled with 'gumming.' Apples, Pears, Plums, Apricots, and the Sweet Cherries all bear their fruit more or less on spurs, but Peaches, Nectarines, and Morello Cherries bear it best upon the long slender growths of the preceding year. When pruning the latter fruit trees in winter, therefore, these shoots should be allowed to remain, only thinning out those that are superfluous.

Disbudding.—This is practically a form of pruning, and may be done early in the season of growth. It consists in rubbing out young shoots that are not wanted, and thus directing the sap to those that are. It is chiefly employed for Peaches and Nectarines.

Special details in regard to pruning will be found under the different fruits described.

Nailing Fruit Trees on Walls.—In every garden where fruit trees are grown on walls a good deal of attention is necessary every year in regard to tying up the branches at the same time as pruning takes place. The two operations—pruning and nailing-up—are as a rule best done at the same time. Where trees are grown on walls facing east, west, and north, as well as south, some little consideration should be given to the effects of aspect on the ripening or otherwise of the wood and fruit. From the quantity and intensity of the sunlight the plants on south walls usually come to a state of maturity first, and those on the east, west, and north follow in the order mentioned.

For the sake of cleanliness it is necessary every year or so, after the fruits have ripened and the leaves have fallen, to unloose all the branches from the walls. The latter may then be washed with a strong solution of soft soapy water to which a little sulphur or petroleum has been added. This will prevent the accumulation of vermin in the cracks and crevices, and consequently becomes a safeguard to the trees against such a foe.

When the re-nailing is done new clean shreds should be used; they should be as narrow as possible and of a sombre hue, as brilliantly coloured shreds very often have an irritating effect on the eyesight. There are several substitutes for the ordinary shreds, such as wall nails with a flexible tag at the top that can be bent round the twig or branch; and also a strong eyeletted shred already provided with a nail to save time. But both these contrivances are much more expensive than the ordinary shreds.

The trees on the north walls should be nailed up first, as it often happens that late in the year, when those on the south wall have been first attended to, the weather becomes warm and mild, and starts the trees into an undesirable growth again. On a sunny day there will often be a difference of 20° to 40° between the temperature of a south wall and one in the shade, and if the branches are hanging loose from the wall they are not so likely to be excited with extra warmth, which will however help in still further maturing and hardening the wood assisted by the free circulation of air. The trees on the west, east, and south walls should afterwards be nailed in succession, and the result of doing the work thus will be to give wall protection first to the plants in the least favourable situations, and consequently hasten the period of their flowering and fruiting the following season.

The Selection of Fruit Trees.—Only trees having a strong, clean, straight stem should be planted, and care should be taken to have them true to name. Weak or crooked-stemmed plants should be avoided as they are often of a bad constitution. Young trees two to four years old transplant better than older ones, and are more easily trained. Particular attention should be paid to the roots to see that they are a mass of fibres, and not damaged, twisted, or gnarled. The sooner they are planted after being lifted the better—always provided the weather is mild and favourable, and neither frosty nor over-wet. In the case of trees that have travelled several miles by rail and may have become dry and shrivelled, it is a good plan to bury the whole—stem, root, and branches—under moist soil. In about a week—more or less according to condition—the branches will have regained their plumpness and freshness, and the trees may then be planted in the usual way.

Training Fruit Trees. — It has always been a favourite practice with gardeners to make plants grow in some other way than that designed by nature. In the case of fruit trees many ingenious devices have been invented to make them grow in certain directions and assume certain shapes, and in this process a thorough knowledge of the plant and how to prune are essential.

1. *The Pyramid* or *Cone*.—Most fruit trees except those requiring the shelter of a wall may be trained in this form. Pears are naturally pyramidal in habit, but

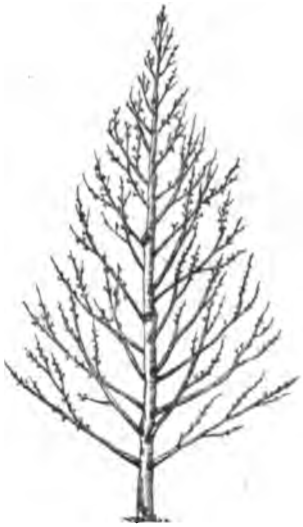

FIG. 142.—PYRAMID TREE.

Apples, Plums, and Cherries may also be trained in this way. The pyramid consists of a vertical stem furnished from base to apex with side branches which gradually become shorter as they near the apex. The branches are more or less ascending as a rule, but may also be trained in a drooping position. The pyramid is one of the best forms, as it admits air and light freely among the branches and foliage, and is usually very productive. To keep the trees in shape the branches require to be regularly stopped and pruned every year. Fig. 142 shows what a well-trained pyramid tree should be like.

2. *The Vase.*—All trees except the Peach, Nectarine, and Apricot may be grown in this shape, but it is particularly suitable for Apples grafted on the Paradise stock. The vase has a short stem from the top of which arise half a dozen or more strong shoots of which the young side branches are generally pruned back every year so as to produce the fruit on spurs. This method of training however is now very rarely practised, as there is little to be said in favour of leaving the centre of the tree or bush vacant when it might be occupied with fruit-bearing branches instead. The diagram (fig. 143) will give an idea of what a bush trained in this way would look like.

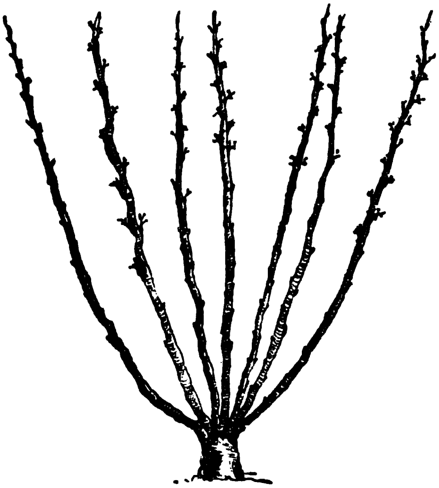

FIG. 143.—VASE TRAINING.

3. *The Bush.*—This resembles the Pyramid but has no main central shoot. The main branches spring from the 'collar,' and dispose themselves at all angles between the horizontal and vertical positions, and require but little training beyond keeping the shoots from overcrowding and crossing each other. Apples and Pears, Gooseberries and Currants are most suitable for growing in bush form. Some growers have succeeded with Peaches and Nectarines grown in this form, but only the earliest varieties should be planted, and very warm sheltered positions must always be chosen for them.

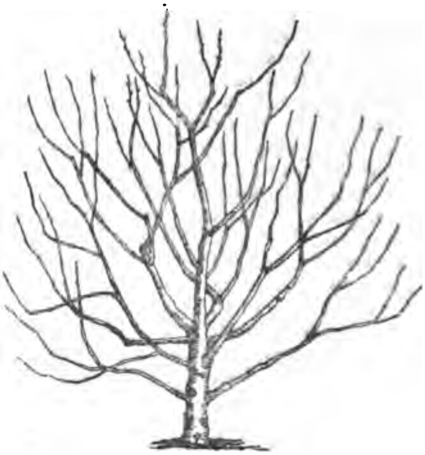

FIG. 144.—BUSH TREE.

There are many advantages in growing dwarf bush Apple trees. Almost every operation connected with pruning, thinning, gathering the fruit, spraying with insecticides, combating insect attacks &c. can be easily carried out much more quickly and with far less damage to the trees than if the latter are on tall stems. Low bush trees also have the advantage of being less likely to catch violent winds, which occasionally do a good deal of injury to tall trees. The fruit also is much more easily picked and is therefore less likely to be bruised, as it will not require to be handled or shaken about so much as when gathered from standards. The drawing (fig. 144) represents a bush tree that stands about 6 ft. high, and shows in a general way how the branches are to be trained so as not to interfere with each other.

4. *Standards and Half Standards.*—

When the bush-form is elevated on a tall stem, it is called a standard, and when on a shorter stem a half standard. Apples, Pears, Plums, and Cherries are often grown as standards or half standards, and in these forms are suitable for orchards and market gardens, where grass, bush, or other crops can be grown beneath them or between the rows.

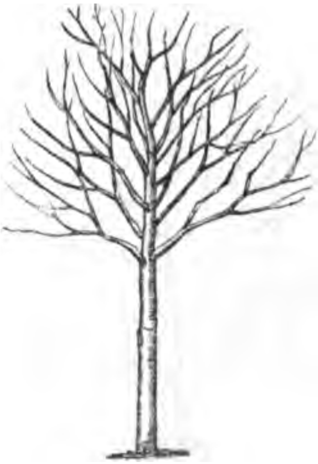

FIG. 145.—STANDARD TREE.

The disadvantages of standard trees chiefly consist in the difficulty experienced in cleansing and pruning them and in gathering the fruit. Ladders have to be used for the purpose, and unless carefully handled the branches are apt to be broken down and the tree otherwise spoiled in appearance. The diagram at fig. 145 shows what a standard tree is like.

5. *Espaliers.*—Fruit trees grown in the open ground with the branches trained horizontally or vertically, or both, are called Espaliers. The branches may be trained to trellises made from horizontal and upright pieces of lattice wood, or to wires strained tightly between two stout poles or stakes. Where there is a long row, wires are better and neater than trellises. Pears are often grown in this way, and sometimes Apples. Espaliers are formed in the first place from a young tree with a single upright stem cut down to about a foot from the surface of the soil. Three buds are retained, one on each side to grow horizontally, and one to form a vertical leader, from which four or more horizontal branches may afterwards be developed on each side, according to the distance apart required. As a rule only one pair of horizontal branches are allowed to develop each year, the vertical stem being cut back to the distance required between the branches and three buds trained as in the first place. For growing parallel with the walks in the fruit garden espaliers are very ornamental. Regular pruning is required to keep them in order. On walls trees may be trained espalier fashion as well as in the open. Fig. 146 shows an espalier in the open air trained to upright stakes, the horizontal branches being kept in position by means of Bamboo canes to which they are tied.

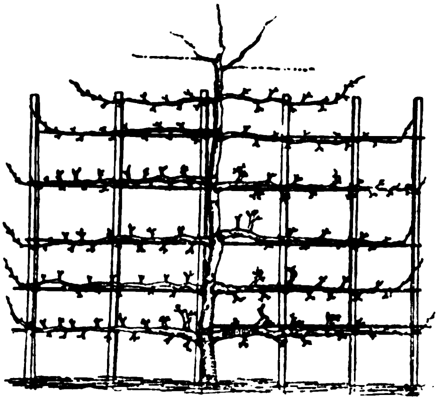

FIG. 146.—ESPALIER-TRAINED TREE.

Sometimes only the first pair of horizontal branches are allowed to develop, and from each of these vertical shoots at regular intervals apart are afterwards trained, and pruned in the same way as the horizontal ones.

6. *Fan-training.*—This method consists in making the branches radiate regularly from the top of a very short stem, like the outstretched fingers of the hand. Trees which have been grafted one year and have made a single shoot are cut down almost to the point of union so as to stimulate the production of several shoots. Difficulty is sometimes found in obtaining a sufficient number, and the trees are cut back the following year with the same object in view. Each branch is trained as required, and the weak ones are strengthened at the expense of the strong, by intelligent pinching and pruning. Fig. 147 shows a fan-trained tree taken from an actual specimen. The

thick branch shows an error in training; great care is necessary with young fan trees in order to prevent this; in a perfect tree the thick portion ascends only about 1½ or 2 feet above the ground level.

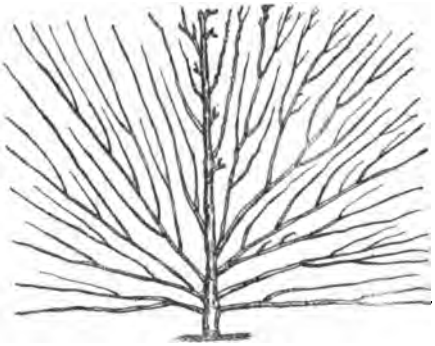

FIG. 147.—FAN-TRAINED TREE.

It will be noticed that the main branches do not radiate with the symmetry of the ribs of a fan, although they were originally intended to do so. The tree, however, being a living thing, and somewhat wilful in its nature, endeavoured in the course of time to take other courses, leaving gaps in some places which had to be filled up later on with younger twigs or branches.

7. *Cordons.*—Trees grown in this way admit of a large number of varieties being grown in a small space. They usually consist of a single main stem running obliquely to the left or right or horizontally. In the latter case, if two branches are trained they may be attached to a wire stretched between two posts. As a rule, however, cordons are confined to walls, and the trees may be as close as 2 ft. from each other. The fruit is borne on the small spur branches at the side, and it is essential that these be pruned every year, to prevent overcrowding.

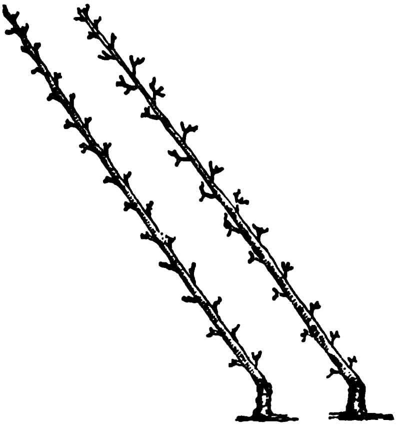

FIG. 148.—SINGLE OBLIQUE CORDONS.

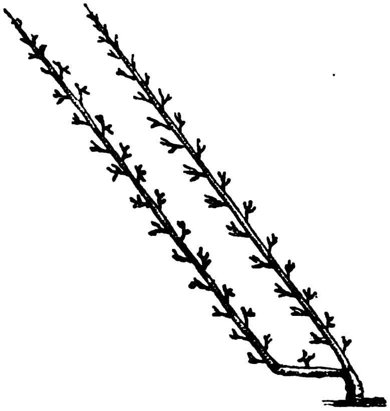

FIG. 149.—DOUBLE OBLIQUE CORDONS.

There are several other forms into which fruit trees may be trained, but they are all more or less modifications or combinations of the above. Figs. 148 and 149 show what oblique cordon training is like with single or double stems, and fig. 150 shows an upright cordon with two vertical stems arising from a single main stem.

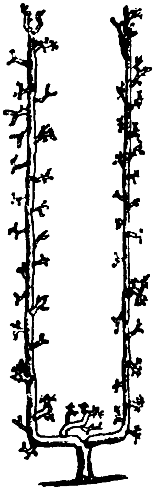

FIG. 150.—DOUBLE UPRIGHT CORDONS.

Fruit Borders

Wherever fruit trees are trained on walls, there is usually a border at the base varying in width according to taste and circumstances. This border is frequently used for producing various crops, such as Strawberries, Dwarf Beans, Early Potatoes, Cabbages &c., without interfering with the roots of the trees. Where such crops are grown they should not be too close to the trees, as the latter like to have the soil covering their roots in a fairly firm condition, and not in a loose state.

As a rule these borders slope at a greater or less angle from the wall to the footpath. The sharper the angle the more directly the rays of the sun play upon the surface of the soil and thus make it warm sooner than if it were flat. This is an advantage, but in dry seasons it is also a disadvantage, especially where difficulty is experienced in obtaining water. Rain and water do not moisten to any great extent the soil on a sharp-angled border; the latter consequently becomes very dry in the absence of moisture, and the roots either suffer considerably, or are driven to lower and less fertile depths in search of it. Except where abundance of water can be given in hot dry weather, it is therefore wise not to have the fruit borders at too great a slope. The flatter border will of course not obtain quite so much sun heat, but on the other hand the evaporation from its surface will not be so great. And again, the extra heat of the raised border naturally induces earlier root action with the result that flowers are produced at an early period, only to be nipped by the late spring frosts. In fact during the summer months, when there is plenty of heat, but often little moisture, the flat border has more advantages than the sloping one.

A good plan with a fruit border is to have the portion near the wall quite level for about 2 to 2½ ft. away from the wall, the remaining surface being at any slope required. The roots of the fruit trees will thus be beneath the level portion which will form a kind of pathway to enable one to attend to the trees. Being walked upon a good deal in the course of the various operations the soil will naturally be trodden down pretty firmly and thus give a solid 'run' to the roots. The sloping portion of the border may then be utilised for the cultivation of various vegetable crops without interfering in any way with the fruit.

STORING FRUIT

Various methods are adopted for keeping fruit such as Apples and Pears in a sound condition after they have been gathered. In large gardens where it is desirable to preserve a quantity of fruit for winter and spring use, it is essential to have a special building for the purpose. The main points to remember in storing fruit are (i) to exclude the frost; (ii) maintain a dry cool atmosphere averaging about 45° Fahr.; (iii) a free circulation of air; and (iv) a very small amount of light, or semi-darkness. Fruit if kept too warm is almost sure to shrivel; if allowed to become too cold, an increase in the temperature causes moisture to condense on the fruits and thus injure them. Too much light causes chemical action and fermentation in the juice, hence the reason for its almost total exclusion.

Pears require rather a higher temperature, say 50° F., and a slightly drier atmosphere than Apples to develop their flavour to the utmost, but on the whole it is safer to err on the side of dampness rather than too much dryness in the fruit room. In a well-constructed fruit-room with care and intelligence there are many kinds of Apples that can be kept in a beautifully fresh condition to the end of May and into June from the previous autumn.

A fruit room may be made of wooden boards and covered with thatch. The walls should be double, about 6 inches to a foot apart, the intervening space being filled with dry straw or sawdust. Glazed windows may be placed at intervals along the sides, but should be provided with shutters to exclude strong light, or the light may be excluded by stippling the glass with whitewash, or one of the mixtures used for shading greenhouses in summer. Ventilation may be provided by leaving an opening at each end of the gable, protected however with a fine mesh wire or perforated zinc, to exclude birds, wasps &c.

Shelves may be arranged all round, each about 2 ft. or a little more wide, and about 2 ft. apart. They are usually constructed of wooden battens 2–3 in. wide, placed about an inch apart so that the air may circulate freely around the fruit and keep the surface dry. The fruit should be handled gently and placed in single layers on the shelves, each kind being kept separate, and if necessary labelled.

Where there are lofts or cellars suitable for the storage of fruit, lattice shelves may be easily fixed up as in the fruit room, or better still fruit trays as made by Mr. Orr of Bedford may be used. These fruit trays are about a yard square, having a perforated bottom formed by narrow wooden battens crossing each other at right angles. They are deep enough to hold the largest Apple or Pear, and possess the great advantage of storing a large quantity of fruit in a very small space. The trays can be placed on top of each other, there being sufficient space between them to remove the fruit from the lower ones without having to lift off the upper ones. The air circulates freely round the fruits, and the trays have all the advantages of a well-equipped fruit-room as far as Apples and Pears are concerned.

Renovating or Restoring Neglected Fruit Trees

It often happens from one cause or another that fruit trees which are neither old nor diseased are brought into a state of sterility and overcrowding of branches by sheer neglect. Each year they produce masses of twigs and leaves, and gradually pass from the fruit-bearing to the barren stage.

Fruit trees which have been neglected in this way may be brought back to a fruitful state with proper treatment—that is, if they are not too old and too diseased, in which case it is better to root them up for firewood and plant young trees in their places.

In restoring a neglected fruit tree, the roots should first of all be properly root-pruned in autumn in the way recommended at p. 1081. Rich fresh soil should take the place of the old in the trenches made, and a good heavy dressing of manure may be placed over the surface of the soil, or a dressing of artificial manures as recommended at p. 1080 may be given.

The head of the tree should then be well thinned out of all weak and superfluous branches, and the tops of the leading shoots may be shortened back a little. When pruning or cutting out wood from fruit trees the operator should always have an intelligent eye on the branches bearing the plump fruit buds or spurs, and should take care that these are left behind, and not the more slender buds which simply form branches and leaves.

If the work has been well and intelligently done, it is possible that a fair show of flowers and fruits will appear the following spring and summer respectively. By attending to the cultivation of the soil, keeping the trees properly pruned and trained, and also free from insect pests and disease, in two or three seasons trees that had been neglected for years may be brought back to a good and fruitful condition by these means. When once trees are in proper order, the labour of attending to them annually is comparatively easy and should be performed regularly.

Fruit Trees in Pots

Wherever a fairly large greenhouse or conservatory exists in a garden, and sufficient room is available, it may with great advantage be used for the cultivation of various kinds of fruit trees in pots, such as Apples, Pears, Cherries, Peaches, and Nectarines. Where such a house does not exist, one can be easily and with little cost erected. There is no necessity to have a boiler and hot water pipes attached, especially if the house is placed in a good sunny position, running east and west for choice, or north and south otherwise. The addition of hot water pipes, however, will not be a drawback, but rather an advantage.

The great value of a glass structure, even though unheated, is that it enables one to protect the blossom, buds, and young fruits on the trees from the spring frosts, and causes the fruits to ripen earlier, besides which they have a peculiarly refined appearance never obtainable on fruits ripened out of doors.

The kinds of fruit mentioned above are most amenable to cultivation in pots, Apricots not being often successful.

Potting, soil &c.—The small young trees are best potted in October. At first, pots 10–12 in. wide across the top are quite large enough, and they will serve for two or three years. The trees, however, are best repotted annually, and should have any strong wiry or woody roots cut away at the time, leaving only the best fibrous masses.

The soil best adapted for fruit trees in pots is a rich yellow loam to which may be added a little well-rotted manure, a little charred refuse, or burnt earth to keep it open, and a good sprinkling of fine bone meal. It is necessary to make the soil richer for pot plants, as the roots are restricted to a comparatively small area.

Good drainage is essential and may be secured by placing a large piece of broken pot over the hole at the bottom, and placing a layer of smaller broken 'crocks' about 1 in. or so thick over it, much in the same way as described at p. 26. These crocks should then be covered with moss or rough fibre out of the loamy soil.

In potting, the stem is kept in the centre with one hand while the thoroughly mixed compost is filled in with the other, the stem being shaken from time to time to settle the soil between the fibrous roots. As the soil should be firmly packed round the roots, a flattish wooden rammer about a foot or so long and a couple of inches wide should be used, working it all round against the inner side of the pot. When finished the soil should not come within 2 inches of the rim, so as to leave sufficient space for holding water.

After potting, the trees should be plunged out of doors in a sheltered position, that is, the pots should be sunk into the soil over the rims, and covered up just as if the trees were planted outside. It is a good plan to place a layer of broken pots, clinkers, or gravel beneath each pot so as to drain the winter rains away from the base. It would not be wise to stand the pots outside without sinking them in the soil, as in the event of hard frosts the young roots would soon be killed. The trees would also be blown over probably many times by the wind, and thus injured a good deal.

From the beginning of February onwards, the trees may be lifted from the open ground and transferred to the glasshouse, but the operation is best deferred if the weather is very frosty, or the soil is in a sodden state with rain. The trees, once indoors, may be syringed on warm bright days in the morning and afternoon, as a rule with rain water if possible, or at least with water kept in the house. Plenty of air should always be given, as a stuffy atmosphere leads to attacks of Aphis and other pests. Should these appear in numbers there is no help for it but to close the house up on a dull evening with little or no wind, and thoroughly fumigate or vaporise it two or three nights in succession, afterwards syringing the plants with clean tepid water. Under any circumstances a thorough fumigation should always be given immediately before the first flowers open.

When the flowers expand, syringing should cease, and the stem of each tree should receive a smart slap of the hand about mid-day, and especially on bright sunny days, to distribute the pollen for the fertilisation of the flowers. When any particular variety does not appear to be 'setting' well, that is, showing the formation of fruit, it is advisable to go over the flowers with a smooth camel's hair brush and transfer the pollen from one flower to the other (see Article on 'Hybridisation,' p. 87). Where bees are kept and frequent the blossoms largely, there is little need of using the camel's hair brush. An easy and excellent method of fertilising the flowers is by means of a good syringe or bellows. By passing a current of air from the syringe over the flowers at mid-day when the pollen is dry and easily distributed, the powdery fertilising agent is blown about, and some of it is sure to become attached to the sticky surface of the ripe stigmas.

In the event of cold frosty weather setting in, the house should be shut up about 3 or 4 o'clock in the afternoon, so that a certain amount of sun heat can be kept in during the night. Where hot water pipes exist, a little heat may be turned on to keep the atmosphere dry and agreeable. Indeed, keeping up a congenial temperature, without too great a difference between that of day and night, is one of the most important points in the culture of fruit trees under glass. When the weather is at all cold and strikingly chilly, it is better to keep the ventilators shut rather than run the risk of giving the plants and setting fruits a sudden chill. Cherries under glass must never be shut up close when in flower; a small chink of air should be left on, day and night; fire heat must also be dispensed with, or reduced to the smallest quantity.

As a rule there will be more fruit set than it is safe for the tree to bear to a mature stage, and thinning out should be practised rather more severely than for outdoor fruit for each kind as recommended under the various heads. Thus what applies in this way to Peaches, Nectarines, Apples, Pears &c. in the open air applies with rather more force to indoor trees in pots.

Summer and winter pruning, as practised out of doors, may also be employed in the case of fruit trees in pots, but each variety should be pruned on its merits and according to its vigour, shyness, and other peculiarities.

When the fruits are well set, and have been sufficiently thinned out, the trees will be greatly assisted by a good mulch of a compost similar to that in which they were potted in the autumn. It is best heaped up round the edge of the pots so as to leave a hollow in the centre to hold the water. Liquid manure in weak doses may also be given two or three times a week at this period, and may be composed of cow manure, with a little soot and guano added, the whole being kept in a bag in the water tank. About a tumblerful added to one or two gallons of water, according to the state of growth, will be sufficient, but care must be taken not to give over-doses.

The application of water is an important matter, and should never be neglected at the proper moment. The soil should never be brought into a sodden state by over-watering, nor should it be allowed to get dust dry. The medium course should be followed, always allowing the soil to get just a little on the drier side before giving a thoroughly good soaking with water.

After the beginning of June the weather will as a rule be warm enough to move the plants out of doors without any danger of frost, and the fruit may be allowed to ripen in the ordinary way, but it is sure to be much earlier than that borne by trees which have been in the open air the whole year.

It is an excellent plan to have two sets of fruit trees in pots, so that one lot may be grown under glass one year, and plunged outside in good rich soil the next. By this means better crops are produced, and the plants are not subjected to such a severe strain as if forced year after year.

KINDS OF FRUIT CULTIVATED

It is an extraordinary fact that nearly all our best and choicest hardy fruits are confined to one natural order. The Apple, Pear, Plum, Bullace, Damson, Cherry, Apricot, Peach, Nectarine, Raspberry, Blackberry, Strawberry, Medlar, and Quince all belong to the natural order Rosaceæ, the botanical characters of which are given at p. 355. The Gooseberry and Currant belong to the Saxifrage order, described at p. 414, while the Fig, Walnut, Cob Nut, Sweet Chestnut and Mulberry belong each to a different order. The Tomato should be classed as a fruit properly speaking, but as it is usually and quite arbitrarily considered as a vegetable it is dealt with in that portion of the work, p. 1137. At almost every exhibition throughout the kingdom the conditions are so arranged that the Tomato shall appear in the vegetable classes. It is however gradually winning its way as a dessert fruit, and will ere long probably take its rightful place in exhibitions among the fruit classes.

PROPAGATION OF FRUIT TREES

The methods of increasing the various kinds of fruit trees described in the following pages are referred to in the proper place. But it may be as well to state here, for the benefit of amateurs who have perhaps neither time nor inclination to multiply their own stock, that it will be far better to obtain fruit trees grafted, budded, or 'struck' on their own roots as the case may be, from nurserymen who make an art of this branch of gardening.

In the following pages are described the best varieties of fruits suitable for outdoor cultivation in the British Islands. No attempt is made to give descriptions of all the varieties enumerated in nurserymen's catalogues, but those which have been proved by experience to yield the best results will be dealt with fully. It is quite a mistake to have too many kinds of any particular fruit in a garden. It is far better to grow a few first-class varieties that will flourish and can be attended to properly than to have several which succeed only passably. It must be remembered that certain kinds of fruits flourish with scarcely any attention in some parts of the country, but are more or less miserable failures in other parts, owing to the difference probably in soil, situation and surroundings. Local conditions should therefore always be fully considered before deciding to plant.

THE APPLE (PYRUS MALUS).—The Apple is probably the most important of all fruits for outdoor cultivation in the British Islands. The wild form or Crab Apple is a native plant but is also found generally throughout the north temperate hemisphere. It is rather small and stunted in appearance, with a sour and unpalatable fruit. Still, from it have been obtained almost all the fine varieties cultivated at the present day.

The cultivated Apple tree rarely exceeds 30 to 40 ft. in height. It has broadly ovate acute leaves, the blades usually much longer than the stalks, downy or woolly beneath, with crenate margins and provided with glands. The flowers are always borne in sessile umbels and vary in size and colour according to variety. They are sometimes pure white, like those of Pears, but are usually striped or suffused with rose and often with bright carmine, and all have a delicate fragrance. Apart from their value in the fruit garden they may also well figure on the lawn, in parks, shrubberies &c. on account of their great beauty when in blossom.

The fruit, which botanists call a 'pome,' is roundish, usually narrowest towards the apex, with a depression at each end, and varies a good deal in size, colour, markings, and flavour—being usually of a brighter and richer colour on the side next the sun.

Training. — Apples may be grown as bushes, pyramids, standards or half-standards, espaliers, or cordons. As bushes and pyramids the trees may be planted from 8 to 12 ft. apart, according to the vigour and compactness of the variety, and standards and half-standards from 15 to 30 ft. apart for the same reasons.

Soil.—The best soil for Apples is a rich adhesive loam on a gravelly or chalky subsoil. Thorough drainage is essential. Poor hot soils must be enriched with plenty of manure, and heavy wet soil must be lightened with plenty of lime and thorough cultivation. Apples being more or less inclined to develop tap-roots should not be planted too deep; they will usually flourish in shallower soils than the Pear, and are also as a rule much hardier.

Pruning. — In comparison with the Pear, little pruning is required, except in the case of cordons and espaliers. As the long slender and flexible branches usually carry the finest fruits, a too severe pruning and summer pinching are likely to do more harm than good. The long straggling shoots are best shortened back a little, and only those that are crossing or growing in towards the centre of the tree, or are otherwise useless, should be cut away altogether (see p. 1031). As some varieties of Apple, mentioned in the proper place, have the peculiarity of bearing their fruits at the ends of the shoots, instead of on spurs at the sides, it is necessary when pruning to observe the difference between flower-buds and fruit-buds. Fig. 151 shows what the flower-buds of an Apple tree are like. It will be noticed that they are much rounder and plumper than the wood or leaf-buds shown in fig. 152. Indeed it may be said that pruning should be done rather with the eyes than with the knife. It is essential that the pruner should know the difference between shoots having flower-buds and those having leaf-buds, and it is to be hoped that the various sketches given will assist him in that direction.

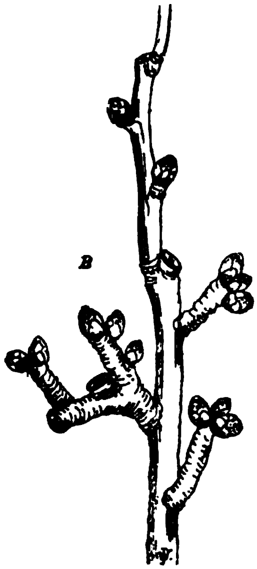

FIG. 151.—FRUIT SPURS OF APPLE.

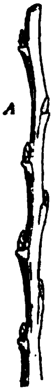

FIG. 152.—WOOD BUDS OF APPLE

Protection. — In cold bleak districts and northern parts generally it is almost essential that Apples should be grown in situations sheltered by walls or stout hedges. In the event of severe spring frosts, dwarf bushes and espaliers should receive some artificial protection if possible when in bloom. Pieces of thin canvas, netting, bracken fronds, or any other light and convenient article may be placed over them lightly before nightfall and removed in the morning. When grown against walls, if the latter has a projecting coping, a good deal of protection will be afforded by this and also by the foliage. It is a tedious task protecting the blossoms, and it is a matter that must be left to the judgment and industry of the grower whether it is worth while to perform it.

Thinning the fruit.—As judicious pruning improves the tree, so does judicious thinning of the fruit improve those that are left to ripen. When the fruits have fairly 'set'—that is, have begun to swell, about the end of May and early June, the trees may be given a light shake. This will bring down a number of young fruits that would never ripen under any circumstances. Others will still remain, but if they have yellowish stalks are best removed by hand at once, as they will drop sooner or later. The removal of others then becomes a matter of judgment, but as a rule if two or three of the best formed and healthiest looking fruits are left to each side shoot, that will be quite sufficient for the tree to carry. If thinning is not performed the branches will bear a mass of small fruits, which very often owing to their weight break down the branches and disfigure the tree—thus pruning and thinning it in an undesired fashion at one and the same time.

Ripeness.—Apples (and other fruits) do not all ripen at the same period, some being early, some mid-season, and some late. The same variety ripens at different periods also according to soil, situation, aspect, and general cultivation. As a rule, however, healthy fruits are ripe when they part easily from the branch on being gently raised to a horizontal position by the hand. If they drop from the tree, assuming they are not maggoty, cankered, or otherwise diseased, they are then fully ripe, and should be gathered immediately.

Gathering.—The more carefully the fruit is picked from the trees the better and longer will it last in a good condition. Shaking the fruit down or knocking it down with sticks or poles is a very primitive and schoolboy method of gathering fruit, and throwing it anyhow into boxes or baskets is little better, as it is thus much injured and bruised and quite unable to last for a long period. Besides, where surplus quantities are sold, they are not likely to secure a good price. From a commercial point of view the more carefully Apples and fruit generally are picked and packed the higher their value. The fruit should also for this same reason be 'graded' according to size, uniformity, and colouring, the best and finest fruits being kept by themselves, and not mixed with the smaller and poorly coloured ones. The different varieties should of course also be kept separate, and not mixed one with another.

Packing Apples.—When Apples are sent to market it is essential that they should be well and securely packed if they are to pay for their cultivation at all. Each grade and variety should be kept separate and distinctly marked. They may be packed in flat baskets with lids—each basket holding about 40 lbs., or in bushels or barrels. The great point is to secure the fruit from being bruised by shifting about in transit. The baskets, bushels, barrels, or other receptacles should be well lined with soft spongy paper, and the fruit should be of the same quality throughout, instead of placing the finest samples on top—a foolish proceeding known technically as 'topping.' Where extra fine fruits of extra choice varieties are marketed, it is well worth while rolling each fruit in a piece of soft paper, and packing the whole in wood wool so that there will be no chance of shifting about. Good fruit well packed always secures a high price if marketed with business intelligence, some varieties of course more than others, according to their reputation for quality and flavour.

Propagation.—Apples may be increased by seeds, cuttings, layers, budding, and grafting. Seeds are usually sown with the object of raising new varieties, and also to produce stocks for grafting or budding. As they do not retain their vitality long, seeds are best sown thinly as soon as ripe in prepared beds in the open air. The seedlings are transplanted the following autumn, with the object of destroying the taproot, and producing root fibres. As a rule the seeds of Crab and Cider Apples are sown for producing stocks, but other varieties may be used for the same purpose. Where new varieties are required the seeds should be saved from the best varieties only, that is, from those remarkable for their hardiness, freedom from canker and other diseases, fruitfulness, and flavour. The seedlings may be grown on after transplanting once or twice, until they fruit. Or, when large enough, to produce a good graft or scion, they may be grafted on to a Paradise Stock, or even a full-grown tree, so as to obtain fruit for testing as to quality and flavour as early as possible.

Cuttings.—Cuttings will root in the

open air if inserted about November. They should consist of the ripened growth of the current year, ending with a small portion or 'heel' of the previous year's wood, and may be 6–9 in. in length. All buds except two or three at the upper end should be removed, and the cuttings may be firmly inserted in sandy soil about half their length. They should then receive a good watering to settle the soil round them, and require no further attention until next autumn when they may be transplanted and pruned according to the shape in which it is desired to grow the tree.

Apple trees raised from cuttings have the advantage of being on their own roots, and many people now consider this a great advantage over budded or grafted trees. In from four to six years, according to variety, the tree will be in full bearing.

Layering.—Apple trees may be, and sometimes are, layered by bending the branches down, and cutting partially through where they come in contact with the soil. When pegged down and covered with earth, they soon root, and when firmly established the layers may be severed from the parent plant. Suckers are sometimes used for purposes of increase, but they are chiefly valuable for stocks. Unless a tree is on its own roots, from a cutting or a layer, the sucker is almost sure to be that of a wild stock, and therefore valueless for fruit bearing. See p. 59.

Budding.—Apples are rarely budded, as the buds are rather late in ripening, and thus beyond the season when budding is usually practised. Under favourable conditions, however, Apples may be budded as easily as other fruit trees or Roses, the operation being performed as described at p. 58.

Grafting.—This is the usual method of increasing Apples. Old trees are usually crown-grafted, but young stocks are generally whip- or splice-grafted. The stocks are usually 'headed down' or cut back to the desired height about January or February, and are generally grafted about the end or middle of March. Bush, standard, and half standard trees are all grafted very low down near the ground, so that in the course of time roots emitted from the scion will assist those of the stock in nourishing the plants.

For the different kinds of Grafting see

Old trees with worn-out tops may often be grafted with advantage and continue for years afterwards to produce good crops of fruit. But it is always a question whether they are worth the trouble of regrafting instead of obtaining young trees. As a rule it is better to obtain young healthy trees than to waste time doctoring up old ones, which may or may not yield fruit afterwards.

Kinds of Stock.—As the Stock has a certain influence on the growth and development of the graft, it may be useful to refer to those usually employed for Apple trees.

1. *The Crab, or Free Stock.*—This is usually raised from the seeds of the Wild Crab or Cider Apples, and trees grafted upon it are regular in outline, very hardy, and are very suitable for orchards and market gardens, where it is impossible to give attention to each individual tree as regards pruning and thinning out. The roots of the Crab Stock are strong and fibrous.

2. *The Doucin Stock.* — This is a variety not quite so hardy or vigorous as the Crab, but in suitable soils is practically quite as robust. It has rather longer and more fibrous roots than the Crab, but does not exhibit such a difference in thickness between stock and graft as does the Paradise Stock. Except in dry soils and for a small number of varieties, trees grafted on the Doucin Stock should not be severely or regularly pruned every year, as they are apt to be rendered fruitless by the operation. It is well to bear this fact in mind, as many gardeners have a mania for pruning every variety, quite regardless as to the stock upon which it may be grafted. Varieties on the Doucin Stock require very little pruning. Just cutting out unnecessary branches and dead wood is sufficient. The trees will form a fine head, and bear abundance of fruit—but not if severely pruned.

3. *The Paradise Stock.* — This is a dwarf variety of Apple easily increased by suckers and cuttings. It is chiefly valuable in the dwarfing influence it exerts, thus producing lower trees. It also influences the earlier ripening of the fruit, and is suitable for the best varieties of Apples to be grafted upon it. The fruits not only mature more quickly, but are also more regular in shape and brighter in colour. Being somewhat less vigorous

than the variety grafted upon it there is usually a distinct inequality in the stems at the point of grafting. Trees grafted on the Paradise Stock require to be regularly and properly pruned every year so that they may not become too quickly exhausted, and continue to produce good crops every year.

Insect and Fungoid Pests.—Among the many pests which attack the Apple tree the following are the most formidable, and require every attention in conjunction with good cultivation to keep them under.

1. *The American Blight* or *Woolly Aphis* (Schizoneura lanigera) is a short-legged Aphis covered with a woolly or cottony down. It attacks all parts of the tree, several usually uniting in a whitish mass. The insects are protected by their woolly covering, and carry on their work by piercing the softer parts of the stems or branches with their sucker-like beaks. As they often secrete themselves in the cracks and crevices of the old bark, and also lay their eggs in these sheltered spots, it is extremely difficult to dislodge them once they have taken a firm hold upon a tree. They produce large cankerous wounds in the stems, and thrive upon the elaborated sap, thus interfering with the vital source of the tree's nourishment. During the summer months the woolly masses are readily distinguished.

Several more or less dangerous and poisonous liquids have been recommended to destroy this pest, but none of them is so effective as boiling water applied forcibly in a fine spray or by means of a brush. As long as the temperature can be kept up to about boiling point, or say not lower than 180°, it is a perfect destroyer. It may be improved by the addition of soft soap and tobacco juice, or a little petroleum. The same arguments do not apply against its use in summer as against some of the strong poisonous insecticides, which unless carefully diluted are apt to severely injure the foliage. Cold water is useless against the greasy woolly covering of the insects. The infested parts of the tree should be well rubbed and painted with the wash, especially the cracks and crevices. In the winter months the trees may be again examined, and all branches too severely damaged should be cut off and burned—not thrown on the rubbish heap to spread the disease anew. Paraffin oil (or petroleum); gas liquor diluted 8 to 12 times its bulk with water; or 1 lb. of crude commercial potash and 1 lb. of caustic soda dissolved together in 10 gallons of water may be used as washes. The latter is very effective, and the 10 gallons may be diluted to 20 for the removal of moss, lichens &c. It removes all parasitic growths and gives the bark of the trees a clean slaty appearance. If the hands are cut or the skin broken in any way, they should be protected with gloves.

Standard trees are more troublesome to clean than dwarf bushes or pyramids. By passing rapidly backwards and forwards along the branches a torch of hay, straw, or any other material giving a flame, at the end of a long pole, the Woolly Aphis may be destroyed in the winter months. As the females have no wings they have to crawl up the stems from the ground. They often nest at the root, and may be dislodged, or rather destroyed, by removing the soil round the base of the trunk, and giving a dressing of lime or soot. Soapsuds are also a preventive and destroyer.

2. *Apple Blossom Weevil* (Anthonomus pomorum).—A tiny reddish-brown beetle less than a quarter of an inch long, having black blotched wing cases obliquely striped and spotted with yellow. The female makes a hole in the unexpanded buds with her slender beak, and in it lays a single egg, repeating the process on as many buds as possible. Whitish grubs develop, and attack the stamens and pistils of the opening flowers, which soon wither and, needless to say, never produce fruit. By the early summer, the grubs having passed through the chrysalis stage, the perfect beetles appear and feed upon the foliage until the winter. They then take refuge in the crevices of the bark, or under the soil at the foot of the trees, emerging in spring to repeat the process of spoiling buds and eating leaves.

It is evident that this pest must be checked and destroyed in winter. This may be done by turning up the soil and dressing with lime, soot, soapsuds &c., and by dressing the bark, paying particular attention to the crevices, with the washes recommended for American Blight. Bandages of tarred cloth, hay, or straw round the stem will prevent the female beetles, which cannot fly very well, or not at all, crawling up to the flower buds. Where they are in great numbers, tarred sheets of paper may be spread beneath the trees to catch them as they fall by shaking the branches.

3. *Codlin Moth* (Carpocapsa pomonana).—This small and very destructive moth has a dark brown body and greenish-brown or grey forewings transversely marked with darker lines, and streaked with brownish-yellow on the hinder portion. During May the female lays a single egg in the calyx of each young fruit, attaching it by means of a sticky secretion. In about a week the whitish caterpillars or grubs, with black head and neck and four rows of black marks along the body, appear, and begin to tunnel their way through the swelling fruit towards the rind, in which they make a hole. When almost fully grown, and having changed to a brownish or greyish hue, they attack the core of the fruit and feed upon the pips, with the result that the fruit drops. The grubs then leave the fruit and seek shelter in the bark, where they spin cocoons and pass into the chrysalis stage for the winter months. In spring the new perfect moths appear and proceed with the destructive operations of their predecessors.

It is difficult to remedy the attacks of the Codlin Moth. One of the most effective remedies is to spray the trees as the fruits are setting with 1 oz. of Paris green dissolved in 20–25 gallons of water. This is a dangerous insecticide and requires to be used with care, especially when the hands are cut or bruised in any way. Where large numbers of trees are to be sprayed it is advisable to use one of the several spraying machines now on the market. Paris green being insoluble in water requires to be constantly stirred, and it should be applied in a very fine spray. It should never be used on trees having fruits almost ripe.

When Apples fall owing to the attacks of the Codlin Moth they should be immediately picked up and burned or given to pigs or cattle. In this way grubs which have not yet left the fruit will be effectually destroyed. Hay bands are sometimes placed round the stems about 1 ft. from the ground for them to nest in, and at the end of the season are detached and burnt. Washing the bark as for American Blight is also useful.

4. *Apple Mussel Scale* (Aspidiotus conchiformis).—These small scaly insects, resembling the half of a mussel shell in appearance, attack the bark of Apple and Pear trees. The scales are about ⅛ in. long, brownish in colour, and serve as shields to the sucking insects beneath. The female is a green fleshy maggot which does not lay its eggs, but retains them until she dies. The larvæ when hatched issue from the protecting shield and begin the cycle of reproduction again.

A strong wash of soft soap and petroleum seems to be the most effective remedy against this tiresome insect. It should be rubbed in well with a stiff brush, removing all the scales. The latter are too hard for any spraying to be effective.

5. *Canker.*—This baneful disease, which attacks some of our finest Apples and renders them useless in some districts, is brought about by the presence of a fungus called *Nectria ditissima.* The chief causes of it appear to be cold, wet soils, severe pruning, and the development of the roots downwards into a sterile subsoil. Great variations in temperature, unfavourable seasons when the wood does not properly ripen, and various other causes are no doubt also in a measure accountable for the canker in fruit trees, as well as placing rank manure in direct contact with the roots.

The best remedies for it appear to be a warm and thoroughly well-drained and cultivated soil, and attention to root pruning to prevent the development of taproots. By keeping the roots near the surface of the soil canker would to a great extent be prevented. The following mixture, applied as a dressing in autumn and spring and hoed in, has been recommended as a most successful preventive of canker by the late Mr. T. F. Rivers, viz. superphosphate of lime 35 lbs., nitrate of potash 21 lbs., nitrate of soda 28 lbs., and sulphate of lime 28 lbs. A ¼ lb. to the square yard, or about 10–11 cwts. per acre, is the amount recommended for each dressing. It is not only a preventive but an excellent manure for the trees. When trees are very badly injured by canker it is scarcely worth while trying to patch them up by washes and insecticides. They are better rooted up and burned, unless the trunks are sound and may be regrafted with a variety other than the diseased one. If the trees are not seriously injured the diseased parts may be washed with a solution made up of 2 lbs. of sulphate of copper to 10 gallons of water. This wash may also be used for preventing the attacks of the Codlin Moth in early summer.

When Apple trees, like the *Ribston Pippin* for example, are naturally prone to canker, it is just possible that canker might be checked by growing the plants upon their own roots (obtained either by cuttings or layers) rather than having them grafted upon a foreign stock. It is impossible to say that this would be a cure for canker, but there is reason to believe that trees on their own roots would be less subject to the evil than grafted ones.

6. *Lackey Moth* (Bombyx neustria). In July and August the female Lackey Moth deposits her eggs on the twigs of the Apple and other trees on which they remain until the following spring. The larvæ, or Social Caterpillars as they are called, are at first black, and live in colonies in a web which they spin over the branches and leaves. If not cleared off by hand-picking, or shaking on to paper spread beneath the trees, they devour the leaves, often stripping the branches completely if unmolested. A good syringing with soft soap and quassia, or a little petroleum mixed with hot water, has been found very effective in destroying the caterpillars.

The caterpillars usually seek shelter in their webs on wet days, which afford a good opportunity for making a raid upon them. On dwarf bushes a mixture of lime and soot sprinkled over the branches in wet weather is a good remedy.

As the eggs are deposited spirally in clusters around the twigs they are easily detected in late summer, and may then be scraped off on to sheets of paper and burned.

The front wings of the Lackey Moth are brownish-yellow, each crossed by a dark band ; the back wings are paler than the front ones, and are fringed alternately with yellow and brown, while the head, throat, and body are of a reddish-brown. The caterpillars are at first black, but become brightly coloured with age. The head is bluish-grey with 2 black eye-like spots, the rest of the body being striped with red, blue, yellow, and white, and densely covered with long silky hairs. When nearly fully grown the caterpillars disperse and seek a suitable place, often in the crevices of the bark, under rubbish &c. to spin an oblong yellow cocoon intermixed with a sulphury powder. The chrysalis is smooth and brownish and from it the new moth emerges in July.

7. *Slugworms* (Eriocampa limacina). These are the grubs of certain sawflies and have earned their name from the black slime covering their hairy slug-like bodies. They appear in autumn and ravenously devour the upper surface of the leaves of Apples, Pears, Cherries, and many other plants belonging to the Rose order, turning them brown and preventing the elaboration of the sap to the detriment of the tree. When fully grown they seek the ground at the base of the tree and spin a blackish cocoon. They remain dormant during the winter, emerging in spring. The female deposits eggs in the under surface of the leaves and in less than a week the larvæ or slug-worms are overrunning the foliage.

Dusting with lime and soot, hellebore powder, and spraying with sulphate of copper or Paris green has been found effectual. The soil at the base of the trees may also be turned up in winter and burned, its place being taken by fresh soil.

8. *Small Ermine Moth* (Hyponomeuta padella).—Apple trees are occasionally attacked by the caterpillars of this moth. The eggs are attached to the branches by a sticky secretion about the end of summer. The following spring the caterpillars, which live in colonies like those of the Lackey Moth, proceed to attack the leaves. They have a brownish head and a grey body spotted with black. They may be destroyed the same way as the Social Caterpillars (Lackey Moth) by syringing with hot water in which soft soap, quassia, or petroleum has been mixed.

9. *Miscellaneous.*—Besides the above pests, there are others which sometimes attack Apple trees, some being fungoid, some insect. Among the fungoid diseases *Mildew* is often seen. It is a whitish mould living on the surface and may be destroyed by spraying with sulphate of copper. *Cracking* is caused by a fungus called *Cladosporium dendriticum*, which attacks the leaves, shoots, and flowers, and often prevents the development of the fruit. The latter is often more or less densely covered with round eye-like blotches, and the surface becomes disfigured and cracked. Cracking seems to be brought about by much the same

causes as canker, viz. cold, wet soils, taproots, severe pruning, and bad cultivation, and may be prevented by rectifying these.

Mistletoe (see p. 781) is a green-leaved parasite often very injurious to Apple trees. It should be cut away clean at Christmas time, when it can be easily seen and may also be sold. The growths of mosses, lichens &c. may be removed by spraying or washing with the caustic soda and potash solution referred to under American Blight (p. 1046).

VARIETIES OF APPLES TO GROW

There are about 2000 named varieties of Apples, and perhaps as many more unnamed ones, but only a very small proportion are actually grown in the British Islands—perhaps 400 at the outside; and some of these very rarely. The following is a selection of the best eating and cooking Apples. The kinds enumerated are suitable for most parts of the kingdom, but some are more valuable for northern parts than others. Although eating and cooking varieties are arranged in alphabetical order, an asterisk * is placed in front of the varieties which are chiefly used for cooking, so that they may be more readily distinguished from the dessert ones. It may however be remarked that nearly all dessert Apples cook well if gathered before they are ripe. When fruits are described as 'large' they are 3 inches or more in diameter; 'medium' 2–3 inches in diameter; and 'small' when less than 2 in. in diameter. Only first-class varieties are mentioned.

Adam's Pearmain.—A handsome eating Apple in use from December to February. Fruit medium, conical, pale yellow tinged with green and covered with delicate russet on the shaded side, but deep yellow tinged with red and delicately streaked with brighter red on the sunny side.

This variety is a free and healthy grower with long slender shoots. It bears freely even when young, and is best on the Paradise or Doucin stock (p. 1045).

***Alfriston.**—This is a splendid cooking Apple, in use from November to April. It is a hardy and vigorous grower, bearing large oblong angular greenish fruits, tinged with orange next the sun and reticulated with russet markings. It is apt to canker on heavy badly drained soils.

Allen's Everlasting.—This may be used either as a dessert or cooking Apple. It has a tender sweet juicy flavour and keeps well till April or May. The flattish fruits are medium in size, very angular near the eye, greenish-yellow, becoming clearer yellow towards maturity, with a few faint streaks of red showing through the russet coat. In good seasons it often has a bright crimson tinge next the sun.

Allington Pippin (*South Lincoln Beauty*).—A new variety of excellent quality, said to be a cross between Cox's Orange Pippin and King of the Pippins. Fruit larger than medium size, ovoid, inclining to conical, with a deep-set eye, and a slender stalk about ½ in. long set in a deep funnel-shaped cavity. The side next the sun is usually streaked with red.

The tree is said to be of a hardy and vigorous constitution and a good cropper.

American Mother.—This is one of the finest flavoured eating Apples in use in October and November. The conical and angular fruits are medium in size, golden-yellow, mottled and streaked with crimson next the sun, and strewed with russet dots. It originated at Boston, Mass.

* **Annie Elizabeth.** — A splendid late cooking Apple in use from February to May, and lasting well. The large roundish conical fruits are prominently angled or ribbed, pale yellow, flushed with bright crimson next the sun.

It grows vigorously and bears freely, and forms an excellent pyramid or standard. Although usually classed as a cooking Apple, it may also be used for dessert, having a crisp sprightly flavour.

Baumann's Reinette (*Baumann's Red Winter Reinette*). — A beautiful dessert Apple in use from November till March. Fruit medium, flat, bluntly angled and ridged round the eye, bright yellow flushed with red, becoming brilliant red on the sunny side, the whole surface embedded with pearly specks.

This is largely grown, and is a very handsome Apple in appearance; but it usually ranks as a second-class variety in regard to flavour, although it keeps well. The tree makes a good pyramid, and as a standard is suitable for orchards.

* **Beauty of Kent.**—A very handsome and showy cooking Apple in use from October to February. Fruit large, roundish ovate, broad and flattened at the base, deep yellow faintly tinged with green and marked with faint red patches on the shaded side; but entirely covered with deep red except where there are a few

patches of yellow next the sun. Tender and juicy with an agreeable subacid flavour.

A vigorous grower and good cropper, forming a fine large pyramid or good standard. It is said to be liable to canker on the Paradise stock in some localities and in heavy moist soils.

* **Bedfordshire Foundling.**—A handsome first-class cooking Apple in use from November to March and April. Fruit large, roundish ovoid or oblong with irregular prominent angles extending from the side upwards and forming ridges round the eye. Skin dark green at first, becoming greenish-yellow when ripening, tinged with orange and having a few fawn-coloured spots on the side next the sun.

The tree bears abundantly, and is more suitable as a bush than a pyramid. It is best on the Paradise stock (p. 1045). It also makes a good standard.

* **Betty Geeson.** — An excellent late cooking Apple in use from December to March and April or even May. Fruit large round, flat, bluntly ribbed, bright shining yellow in colour, with a deep blush on the sunny side. The tree is a great bearer.

* **Bismarck.** — A handsome cooking Apple in use from December to April. Fruit large flat, yellow, flushed and striped with red next the sun. It grows well and bears freely on either the Crab or Paradise stock.

***Blenheim Orange** (*Blenheim Pippin*). A valuable and popular cooking or dessert Apple in use from November to February. Fruit large roundish or flattened, regular in shape, yellow, tinged with dull red next the sun, and streaked with deeper red. Although this variety is a strong grower it takes several years before it becomes a free cropper, especially if grown as a standard. It does well grown as a bush or pyramid, grafted on the Paradise stock.

Braddick's Nonpareil.—This is one of the best winter dessert Apples, being in use from November to April. Fruit medium, flat, slightly angled, greenish - yellow, brownish-red next the sun, russety round the eye, and covered here and there with patches of brown russet.

The tree is a good bearer, quite hardy, and slender in growth, but never attains a great size. On the Paradise stock it forms good bushes, pyramids, or standards, and may also be grown as an espalier.

* **Bramley's Seedling.**—An excellent cooking Apple in use from January to March. Fruit large, handsome flattish, with five distinct ribs or bosses round the eye. Skin greenish-yellow tinged with pale red, and heavily striped with deeper red when ripe.

The tree is a hardy and vigorous grower, but must be grown on the Paradise stock to form good bushes. It also makes a fine pyramid or standard.

Brownlees' Russet.—An excellent late dessert Apple in use from January to May. Fruit medium, roundish ovoid, and rather flattened, green and russety, brownish-red next the sun.

This variety does well as a pyramid or standard, and although only a medium grower, flourishes and bears good crops on cold soils and in situations where other varieties fall a prey to canker.

* **Castle Major.**—A fine cooking Apple in use during October and November. Fruit very large, roundish conical, prominently ribbed from base to apex, deep yellow all over, but flushed with reddish-orange next the sun.

This is a good variety for market gardeners, and grows well on either the Paradise or Crab stock, making a good pyramid or standard.

* **Cellini.**—A fine showy and handsome cooking or dessert Apple in use during October and November. Fruit large, roundish conical, flattened at both ends, rich deep yellow spotted and blotched with red on the shaded side, but bright red streaked and mottled with dark crimson next the sun, with a gleam of yellow here and there. The tree forms a large pyramid when fully grown, and also succeeds well as a standard.

Claygate Pearmain.—A fine dessert Apple with a Ribston Pippin flavour, and in use from November to March. Fruit medium, conical, dull yellow mixed with green, thinly coated and dotted with russet, but streaked with dark red on the sunny side.

The tree is a slender grower of medium height, and bears freely. It is best as a bush on the Paradise stock (p. 1045).

Cockle's Pippin.—This is one of the finest dessert Apples and is in use from January to April. Fruit medium, conical or ovoid, slightly angled at the sides, greenish-yellow changing to deeper yellow when ripening, dotted with grey, and covered all over the base with delicate pale brown russet. Fine aromatic flavour.

This variety grows freely but does not attain a great height. It does well as a standard.

Cornish Aromatic.—An excellent dessert Apple in use from October to Christmas. Fruit medium, roundish ovoid, distinctly ribbed with more or less prominent ridges round the eye, yellow, blotched with pale brown russet, but of a beautiful bright red with deeper coloured streaks, and russety patches and dots on the side near the sun.

In some localities this Apple does not quite come up to others in flavour, although the tree grows freely and bears well—but apparently only on the Paradise stock (p. 1045).

Cornish Gilliflower.—This fine dessert Apple is in use from November to April or May, and is remarkable for its rich aromatic flavour. Fruit medium, ovoid, angular on the sides and ribbed round the eye. Skin dull green on the shaded side, but brownish-red with brighter red streaks on the sunny side, parts of the surface being marked with thin russet.

The tree is a free but medium grower, and unfortunately does not bear large crops. The fruits are borne at the ends of the previous year's shoots, a fact to be borne in mind when pruning. It does well on the Paradise stock and makes a good standard tree, but is also suitable as a bush or espalier.

Court of Wick.—A fine dessert Apple of rich and delicious flavour, in use from October to March. Fruit small, roundish ovoid, clear yellow when fully ripe, tinged with bright orange which sometimes breaks out into faint red next the sun, and freckled all over with russet.

The tree attains a medium height, grows vigorously and crops well, the fruits on some soils becoming very highly coloured. It succeeds well as a pyramid or standard, and is rarely attacked by blight or canker. On the Paradise stock it produces larger fruit than on the Crab, and often assumes a very straggling habit.

Court Pendu Plat.—A handsome and valuable dessert Apple in use from November to April or May. Fruit medium, flat, at first bright green on the shaded side, becoming clear yellow as it ripens, streaked and dotted with russet, and entirely covered with deep rich red next the sun.

The tree is very hardy, small in growth, and a heavy cropper. On the Paradise stock it makes fine bushes and espaliers, but also does well as a standard. It flowers later than any other variety, and the blossoms thus often escape being injured by spring frosts. The fruit should be allowed to hang on the tree as long as possible, as if picked too soon it becomes tough and indigestible.

Cox's Orange Pippin.—This is the finest eating Apple *par excellence*, and is in use from October to February. Fruit medium, roundish ovoid, even and regular in outline, greenish-yellow, streaked with red, but deep red on the side exposed to the sun, crusted with patches and streaks of grey russet.

The tree is a medium grower, forming a well-shaped pyramid and producing fruit freely when on the Paradise Stock. It may be grown also as a standard, but in many parts in cold heavy soil it does not grow well and becomes afflicted with canker (p. 1045).

* **Cox's Pomona.**—A fine handsome cooking Apple fit for use in October and November. Fruit large, roundish or flattened, angular, yellow, heavily streaked with bright crimson, and where fully exposed to the sun entirely crimson with deeper crimson stripes and patches, but russety in the hollow at the base.

The tree forms a well-shaped pyramid and bears large crops with great regularity. The fruit may also be used as dessert. It should be allowed to hang on the tree late.

D'Arcy Spice (*Baddow Pippin*).—A fine-flavoured, richly aromatic dessert Apple, in use from November till April or May. Fruit medium, round or slightly flattened, prominently ribbed and ridged at the crown. Skin deep lively green, becoming yellowish-green when ripening, but suffused with dull red changing to orange on the side next the sun, the whole being thinly coated and dotted with russet.

The tree is dwarf in habit and is excellent as a bush, but may also be grown as a standard.

Devonshire Quarrenden.—An excellent dessert Apple ripe about the first week in August, and lasting till the end of September. Fruit small, flat, smooth and shining, deep purple red when fully exposed to the sun.

It is best on the Paradise stock, and makes fine free-bearing bushes or pyramids, or half standards.

Duchess's Favourite (*Duchess of Gloucester; Scarlet Incomparable*).—A handsome dessert Apple fit for use from November to Christmas. Fruit small, round, bluntly angled, bright red when fully exposed to the sun, but yellow where shaded, and russety at the base. A good market variety for the south-eastern counties.

Duchess of Oldenburg.—A fine dessert Apple of Russian origin, ripe in the middle of August, and lasting till the end of September. Fruit large, round, sometimes prominently ribbed, greenish-yellow, but streaked with broken patches of bright red on the sunny side, and sometimes beautifully flushed with dark crimson, the whole being heavily dotted with russet. Very juicy with a pleasant, brisk, and refreshing flavour.

The tree grows freely and bears heavy crops. It makes a medium-sized bush or pyramid, and also a good standard.

Duke of Devonshire. — An excellent eating Apple, with a sweet and fine aromatic flavour, lasting from February to May. Fruit medium, roundish ovoid, of a uniform lemon-yellow flushed with dull red on the sunny side and veined with russet.

The tree forms a large and regular pyramid and a compact standard.

* **Dumelow's Seedling** (*Wellington*).—This excellent cooking Apple is in use from November to March, and is probably much better known as Wellington than by the name here adopted. Fruit large round and somewhat flattened, clear pale greenish-yellow sparingly dotted with russet, and tinged with pale red on the sunny side, which is sometimes almost entirely covered with bright red.

The tree makes a handsome pyramid and is a heavy cropper both in this form and also as a standard. It is largely grown in market gardens round London.

***Dutch** (or **Royal**) **Codlin.**—A handsome cooking Apple in use during August and September. Fruit large, conical and angular, pale greenish-yellow, slightly tinged with orange or pale red next the sun. The tree forms a medium-sized pyramid, and also succeeds as a standard.

Dutch Mignonne (*Reinette de Caux*). A dessert Apple with a rich sweet flavour; in use from December to April. Fruit rather large, roundish, sometimes slightly ribbed near the eye; dull greenish-yellow in colour, marked all over with broken streaks of pale red and crimson, with traces of russet and numerous russety dots especially round the eye.

The tree forms a medium-sized pyramid when fully grown, but succeeds as a standard or bush. The branches are thickly set with fruit spurs, and bear heavy crops, especially when grown on the Paradise stock (p. 1045).

***Ecklinville.**—A fine and handsome cooking Apple in use from October to Christmas, and having a brisk subacid flavour. Fruit large, roundish and flattened, slightly angled round the eye. Skin bright, rather deep lemon-yellow tinged with green, sparingly dotted with russet and flushed with crimson on the sunny side.

The tree forms a good pyramid and is a wonderfully heavy and constant cropper. It is a first-rate market Apple, and requires little attention in regard to pruning. In some localities this is very liable to spot and should then be planted only sparingly.

***Emperor Alexander.** — A beautiful Apple usually considered a cooking variety, but also valuable for dessert. It is in use from September to December. Fruit sometimes very large, conical, greenish-yellow, streaked with red on the shaded side, and orange and bright red next the sun, the whole surface being covered with russety dots.

The tree is a strong grower and good cropper, and is remarkable for its long stout shoots.

Fearn's Pippin. — A very handsome and attractive dessert Apple in use from November to February. Fruit medium, flattish, pale greenish-yellow streaked with dull red on the shaded side, and deep crimson with grey dots and russet patches on the sunny side.

The tree makes fine pyramids and good standards, and bears heavy crops with great regularity. Its fine colour and rich flavour make it a favourite with market gardeners.

***Frogmore Prolific.**—A splendid cooking Apple in use from September to Christmas. Fruit large, round and smooth, pale greenish-yellow slightly streaked and shaded with crimson on the sunny side.

The tree succeeds both as a pyramid and standard, and is a great cropper.

Gascoyne's Scarlet. — A handsome looking dessert Apple in use from October to January. Fruit large, conical, angular, pale yellow streaked and flushed with bright rose. The tree is a vigorous grower and makes a good standard; it is a good cropper on the Paradise stock.

Gloria Mundi (*Belle Dubois*). — A handsome cooking Apple in use from October to January. Fruit very large, flattish, angled and ribbed round the eye, pale yellowish-green dotted and patched with delicate russet and faintly flushed with red on the sunny side.

It forms a large pyramid, and also succeeds as a standard.

***Golden Noble.**—A very handsome cooking Apple in use from September to December. Fruit large, round and heavy, clear bright golden-yellow, with a few small reddish spots and patches of russet.

It makes a medium-sized pyramid and good standard, and usually bears heavy crops especially on the Paradise stock. The fruits are borne at the ends of the shoots.

***Golden Spire.**—An excellent cooking Apple in use from October to December. Fruit medium, conical, ribbed round the eye, pale yellow flushed or mottled with orange and red on the side next the sun.

The tree forms a medium-sized pyramid and good standard and bears abundantly. The shoots however have rather a spindly habit. Owing to the handsome appearance of the fruit this variety is a great favourite with market gardeners in some parts of the country.

Gravenstein.—A fine dessert Apple in use from October to December. Fruit large, flat, angular, clear pale waxen yellow, streaked and dotted with bright crimson, intermixed with orange, on the sunny side.

The tree forms a large handsome pyramid and is generally a good cropper with a fine spicy flavour.

***Greenup's Pippin** (*Yorkshire Beauty; Red Hawthornden*).—An excellent cooking or dessert Apple with a sweet brisk flavour, in use from October to December. Fruit large, round, flattened, with a prominent rib on one side, pale straw-yellow tinged with green, but of a beautiful bright red on the side next the sun, and marked with patches of thin delicate russet.

The tree is vigorous and healthy, not very tall, but a heavy cropper and a good market variety. Does well as a pyramid, standard, or espalier on light soils.

***Grenadier.**—A fine handsome cooking Apple with a pleasant acid flavour and a fine perfume; in use during September and October. Fruit large, roundish ovoid, prominently and bluntly ribbed, of a uniform yellowish-green colour, somewhat deeper in tone on the sunny side.

The tree makes a medium-sized pyramid and also succeeds as a standard, having large and constant crops.

Harvey's Wiltshire Defiance (*Scorpion*).—This handsome and excellent cooking or dessert Apple, with a rich sweet vinous flavour, is in use from the end of October to January or February. Fruit very large, flat, angular, fine deep sulphur-yellow, of a deeper tint on the sunny side and studded with minute russety dots, with here and there irregular patches of russet.

The tree forms a large pyramid and succeeds as a standard. It is a good market variety.

***Hawthornden.**—A first-class tender and juicy cooking Apple in use from October to Christmas. The fruit varies considerably in size according to soil and situation, but is usually above medium size. It is roundish and flattened in shape, sometimes with a prominent rib on one side, greenish-yellow, flushed with red on the sunny side, and generally covered with a delicate bloom.

It forms a small pyramid when fully grown, and thrives in almost any part of the kingdom. It is an early and abundant cropper, but in cold heavy soils is subject to canker and American blight.

***Hormead Pearmain.** — An excellent cooking Apple with a pleasant acid flavour; in use from October till March. Fruit large and handsome, roundish, conical, greenish-yellow, becoming quite yellow when fully ripe, tinged with orange on the sunny side, with traces of russet here and there.

Irish Peach. — A beautiful dessert Apple with a very refreshing and agreeable flavour. It is ripe the first week in August and lasts during the month. Fruit medium, flattish and slightly angled, pale yellowish-green, flushed with dull reddish-brown and thickly dotted with green on the shaded side, but bright red mottled and speckled with yellow on the sunny side.

This excellent summer Apple bears abundantly at the ends of the shoots and succeeds as a bush, pyramid, or half-standard. The fruits are best eaten from the tree.

Joaneting (*White Juneating*).—This is the earliest of all eating Apples, being at its best in July and August, when it should be eaten from the tree as it is apt to become mealy if kept. Fruit small, round, and slightly flattened, pale yellow-green, becoming clear yellow flushed with red or orange on the sunny side.

The tree forms a small pyramid and bears better and earlier crops when grown on the Paradise stock than when on the Crab. It is suitable for orchard culture.

* **Jolly Beggar.**—A fine cooking Apple having a brisk and pleasant flavour, and fit for use from August to October. Fruit medium, round and flattish, pale yellow, flushed with orange on the sunny side, and dotted with russet.

This is a very heavy and constant cropper, and small bushes are laden with fruit.

Kentish Pippin (*Colonel Vaughan*). An excellent sweet and briskly flavoured dessert Apple in use from October to January. Fruit medium, conical and slightly angular, pale yellow, striped with brownish-red and yellow-speckled next the sun, but speckled with green on the shaded side.

The tree is hardy and vigorous, and attains a good size, bearing good crops.

Kerry Pippin.—A first-class dessert Apple, in use during September and October. Fruit below medium size, more or less roundish ovoid, smooth and shining greenish-yellow, changing to clear pale yellow with ripeness, tinged and streaked with red on the sunny side. When fully exposed it is bright shining crimson, with deeper crimson streaks, and delicate russet traces on the shady side.

The tree grows freely about medium height, and bears good crops, either as a bush or espalier on the Paradise stock.

* **Keswick Codlin.**—This is one of the earliest and best of cooking Apples, and is in perfection during August and September. Fruit medium, conical angular, with rather sharp ridges round the eye, pale yellow in colour, sometimes flushed with orange or red next the sun.

The tree forms a handsome pyramid of medium size and bears great crops. It flourishes in all parts of the country, is suitable for orchard culture, and is a great favourite with market gardeners.

King of the Pippins.—A handsome and highly flavoured dessert Apple ripe at the end of August and lasting until November and December. Fruit medium ovoid or conical, greenish-yellow, flushed with red next the sun, and marked with a little rough brown russet.

The tree is a compact grower, and forms a fine bush, pyramid, or standard; it is best grown in a warm, strong, well-drained soil.

King of Tompkins County.—A handsome pleasantly flavoured dessert Apple of American origin, fit for use from December till March, or even longer. Fruit large, round, flattish, bluntly angled, with ridges at the crown and base. Skin deep rich yellow, heavily streaked with crimson on the sunny side.

The tree grows freely and bears large crops. It is very hardy, and forms fine pyramids or standards.

* **Lady Henniker.**—A fine cooking Apple, also useful for dessert, and fit for use from October to February. Fruit very large, roundish, conical, bluntly angled on the sides, and prominently ridged round the eye. Skin yellow, with a faint blush of red, which is streaked with crimson on the sunny side.

The tree is hardy and vigorous, and a great bearer when fully developed. It makes a fine bush, pyramid, or standard, and is suitable for market gardening.

Lady Sudeley.—A very fine and handsome eating Apple with a rich and juicy flavour, and in use during August and September. Fruit medium, roundish, conical, pale greenish-yellow streaked with crimson on the sunny side.

The tree forms a small pyramid or bush, and bears heavy crops.

* **Lane's Prince Albert.**—A very handsome and valuable cooking Apple fit for use from October to May. Fruit large, roundish-conical or ovoid, bluntly ridged round the crown. Skin smooth and shining grass-green, changing to clear pale yellow when ripening, and becoming flushed with pale red irregularly streaked with crimson on the sunny side.

The tree forms a medium-sized bush, pyramid, or standard, and rarely fails to produce a heavy crop of fruit. It is an excellent variety for market growers. It may be stated, however, that when grown as a standard the branches have a more or less weeping habit.

Lemon Pippin.—A good Apple equally suitable for dessert or cooking, and fit for use from October to April. Fruit medium ovoid, resembling a Lemon in shape, pale yellow in colour, and tinged with green, changing to lemon-yellow with maturity, freckled and patched with russet.

The tree is hardy, vigorous, and a heavy cropper, but only attains middle size.

* **Loddington** or **Stone's Seedling.**—A fine handsome cooking Apple in use from September to November or December. Fruit large, round, flattish, bluntly ribbed, and ridged round the eye. Skin smooth and shining grass-green tinged with brown on the sunny side, but changing with age to lemon-yellow flushed with pale crimson, with broken streaks and specks of deep crimson next the sun, the whole surface being covered with minute russet dots.

The tree makes very little wood, but produces an abundance of fruit spurs. It is compact and medium in growth, and bears immense crops when well treated. It is best as a bush.

* **Lord Derby.** — A beautiful and excellent cooking Apple resembling *Gloria Mundi*, and fit for use up to Christmas. Fruit very large, roundish conical, prominently ribbed and ridged round the eye, deep grassy or yellowish-green dotted and lined with russet.

The tree is a vigorous grower and heavy cropper. A valuable market variety.

* **Lord Grosvenor.** — A handsome cooking Apple in use from September to November. Fruit large, ovoid or conical, prominently and irregularly ribbed with ridges and puckers round the eye, pale straw-yellow in colour, with here and there a few dots and traces of pale brown russet.

The tree makes a good pyramid or standard, and fruits very freely.

* **Lord Suffield.** — A fine cooking Apple in use in August and September. Fruit large, conical or ovoid, bluntly angled, pale greenish-yellow, sometimes—but very rarely—tinged with pale red on the sunny side.

The tree bears early and abundantly, and for this reason does not attain a great age. It is very liable to canker in unsuitable soils.

Mabbot's Pearmain.—A valuable and highly flavoured dessert Apple in use from November to January. Fruit medium, round, bluntly angled, bright yellow tinged with pale red on the shaded side, but deep red on the sunny side, the whole surface being freckled with grey russet.

Succeeds as a standard, and suitable for orchards.

* **Manks Codlin.**—An excellent cooking Apple with a brisk, juicy, and perfumed flavour, ripe early in August, and lasting till November. Fruit medium conical, slightly angular, greenish-yellow, changing to clear pale yellow flushed with orange-red next the sun, or sometimes a clear bright red.

The tree grows to a medium height, and is very hardy and prolific, even when young. It makes a handsome pyramid on the Paradise stock, and also a good standard. A good market garden variety.

Mannington Pearmain.—A fine richly flavoured dessert Apple in use from October till March. Fruit medium, conical, golden-yellow, thinly coated with brown russet on the shaded side, but flushed with dull brownish-red, and covered with large russet dots on the sunny side.

The tree bears abundantly as a pyramid, and is also suitable for orchards. In order to secure the rich flavour peculiar to this Apple, the fruits should be allowed to hang on the trees late. If gathered too soon they are apt to shrivel and lose a good deal of the crisp juiciness.

Margil.—A fine dessert Apple rivalling the *Ribston Pippin* in flavour. Fruit medium, round or conical, sharply angled and ridged round the crown, orange or greenish-yellow, streaked with deep red, and covered on one side with patches of russet.

The tree is a small grower, but forms a neat pyramid, and is good as an espalier on the Paradise stock. It is quite hardy and usually bears heavy crops if not injured by spring frosts.

Melon Apple.—An excellent agreeably perfumed dessert Apple of American origin, in use during December and January. Fruit large, roundish, conical, slightly angled, lemon-yellow tinged with green, and delicately veined with pale brown russet, being crimson with darker crimson streaks and patches and veins of brown russet on the sunny side.

The tree makes a good bush, but may also be grown as a pyramid or half standard.

***Mère de Ménage.**—A handsome cooking Apple fit for use from October to March. Fruit very large, sometimes enormous, roundish ovoid or conical, prominently ribbed and ridged round the eye, bronzy-red, streaked with deeper red all over, except a little on the shaded side, which is yellow.

The tree makes a good bush or pyramid, and is a good cropper.

Mr. Gladstone.—A sweet juicy and well-flavoured eating Apple ripe in August and best eaten from the tree as the fruits do not keep long. Fruit small flattish and regular, dull red heavily streaked with dark crimson except where shaded, when the colour is yellowish.

The tree forms a small pyramid and succeeds as a standard. Useful for orchards and market gardens.

***Mrs. Barron.**—A fine cooking Apple in use from October to February. Fruit very large, oblong, angular, pale yellow, flushed on the side next the sun.

The tree flourishes on the Crab or Paradise stock as a pyramid or standard and bears well.

***Nelson Codlin.**—An excellent cooking Apple in use from September to January. Fruit large, conical or oblong, greenish-yellow speckled with russet, but deep yellow on the sunny side, covered with large dark spots ringed with crimson.

The tree is a vigorous and healthy grower and bears freely as a pyramid or standard.

***New Hawthornden.**—A handsome cooking Apple in use from September to the end of October. It resembles the old *Hawthornden* (p. 1058) in form and colour though much larger, but must not be confused with *Winter Hawthornden* (p. 1058). Fruit large, flattish, bluntly ribbed and ridged round the eye, pale green, changing to pale lemon-yellow with ripeness, and sparingly dotted with russet.

The trees bear abundantly when young, but the fruit will not last beyond October, after which it becomes attacked with fungoid specks.

The *Red Hawthornden* is the same as *Greenup's Pippin* (p. 1058).

***New Northern Greening.**—A handsome cooking Apple in use from November to May. Fruit medium, roundish ovoid, green streaked with red.

***Newton Wonder.**—A valuable cooking Apple, keeping well from November to March or longer. Fruit large.

***Northern Greening.**—A fine cooking Apple with a brisk and somewhat vinous flavour, in use from November to April or May. Fruit medium, roundish ovoid, beautiful grassy green in the shade, and dull brownish-red with deeper red and broken stripes on the side next the sun.

The tree is a sturdy vigorous grower, and bears heavy crops as a pyramid or standard.

Peasgood's Nonesuch.—A remarkably fine Apple suitable either for cooking or dessert, and in use from September to November. Fruit very large and handsome, roundish, conical, greenish-yellow, flushed with red and heavily streaked with deep crimson on the sunny side.

The tree grows well as a bush, pyramid, or standard, and produces very fair crops. Very popular.

***Potts' Seedling.**—An excellent cooking Apple in use during September and October, and often November. Fruit large, oblong, angular, puckered and ribbed round the eye, pale greenish-yellow dotted with russet.

The tree makes a medium-sized pyramid. It also succeeds as a standard, and bears freely.

***Queen.**—A very handsome and popular cooking Apple resembling *Cox's Pomona*, but larger, and in use during October and November. Fruit large, flat and even, ribbed and 5-knobbed round the eye, clear lemon-yellow, flushed with bright crimson, and marked with streaks and patches of deeper crimson, while the deep hollow of the stalk is covered with russet.

The tree makes a fine pyramid or standard and bears well.

Reinette de Canada.—A fine juicy Apple brisk and highly flavoured, and in use from November to April for either cooking or dessert purposes. Fruit large, flattish, conical, distinctly ribbed, greenish-yellow, flushed with brown next the sun, and densely dotted and veined with russet.

The tree naturally forms a spreading bush, and in this form produces finer fruit than on standards or pyramids.

Ribston Pippin.—A splendid dessert Apple, at its best during November and December, but with careful storing can be made to last till May. Fruit medium, roundish and somewhat irregular in outline, with blunt and unequal angles, greenish-yellow, changing to dull yellow with age, streaked with pale red and deep crimson next the sun, and usually russety at the base.

The tree forms a fine pyramid and succeeds best on a dry warm soil of a rather sandy nature. It is best on the Paradise stock and should not be transplanted too often or grown in heavy cold soils, where it usually becomes cankered. A possible cure for canker in this variety is to have the plants on their own roots obtained by cuttings or layers. Where it fails *Margil* is a good substitute.

***Sandringham.**—A handsome cooking Apple in use from December to April. Fruit large, conical, slightly angular, dark green at first, covered with a grey bloom, afterwards yellow flushed and striped with red.

The tree bears well on the Paradise or Crab stock (p. 1045).

Scarlet Nonpareil. — An excellent dessert Apple in use from January to March. Fruit round and regular, yellowish, streaked with pale red, but much deeper and brighter in colour on the side next the sun, and covered with patches and specks of russet.

The tree is slender in habit but hardy and vigorous. It makes a good pyramid, bush, or half standard, and is suitable for orchards and small gardens.

***Schoolmaster.**—A fine cooking Apple in use from December to March and April. Fruit large, bluntly ribbed and ridged, bright green changing to greenish-yellow, flushed with red on the sunny side, and covered all over with large russety freckles.

This is a good and constant cropper.

***Small's Admirable.** — An excellent delicately perfumed cooking Apple fit for use in November and December. Fruit medium, roundish, ovoid and flattened, bluntly angular on the sides, and of a uniform lemon-yellow colour.

The tree attains a medium size and bears heavy crops as a bush or pyramid, but also succeeds as a standard.

***Stirling Castle.**—An excellent juicy cooking Apple in use during August and September. Fruit large, round, flattish, pale yellowish-green changing to pale straw-yellow when ripe.

The tree makes a fine bush, also a handsome pyramid and good standard (although the growths are rather weak), and bears heavy crops with great regularity.

***Striped Beefing.**—One of the handsomest and best of cooking Apples in use from October to May. Fruit very large round and flattened, obscurely ribbed, bright green with broken streaks and patches of deep red, and numerous russety dots.

The tree forms a fine pyramid and is suitable for orchards. It is very hardy and an excellent cropper.

Sturmer Pippin.—A highly valuable and deliciously flavoured dessert Apple, fit for use from February to June. Fruit below medium size, round, flattish, bright green to yellowish-green, and almost entirely covered with brown russet, the side next the sun being often flushed with dull red.

The tree forms a medium-sized pyramid. It is very hardy and a free cropper.

Summer (or **Autumn**) **Pearmain.**—An excellent and highly perfumed Apple in use during September and October and fit for dessert or cooking purposes. Fruit not up to medium size, conical, angular, yellow, covered with streaks and patches of red, mixed with silvery russet and numerous russety dots.

The tree has a fine upright habit and makes a good standard. On the Paradise stock it also does well as an espalier and bush.

***Tower of Glammis.** — An excellent fine-flavoured cooking Apple in use from November to February. Fruit large, conical, distinctly 4-angled, deep sulphur-yellow flushed with green and sparingly dotted with russet.

The tree makes a fine standard, pyramid, or bush, and bears good crops when well established; but it seems to take several years to reach this stage. It makes a good heavy market Apple.

***Tyler's Kernel.**—A handsome cooking Apple in use from October to January. Fruit large conical prominently angled, brilliant red with darker red streaks, but paler and tinged with green on the shaded side.

The tree grows well as a bush or pyramid on either the Crab or Paradise stock, and also succeeds as a standard.

***Wadhurst Pippin.** — An excellent cooking Apple with a crisp juicy flavour, and fit for use from October to February. Fruit large, ovoid, somewhat angular yellow, faintly tinged with green on the shaded side, and brownish-red streaked with crimson on the side next the sun, dotted with grey.

***Waltham Abbey Seedling.**—A very fine cooking Apple in use from September to January, having a sweet juicy flavour, and assuming pale amber when cooked. Fruit large, roundish ovoid, pale yellow, flushed with red next the sun, and covered all over with minute russet dots and occasionally a few thin patches of russet.

The tree is remarkable for the smallness of its foliage, which is in striking contrast to the large fruits, which are borne in great abundance on bushes, pyramids, or standards.

* **Warner's King.** — An excellent and handsome cooking Apple lasting from November to March. Fruit very large, roundish ovoid, flattened, bluntly angular, grassy green changing to a clear deep yellow with ripeness, and covered with dots and patches of pale brown russet.

The tree grows vigorously and bears heavy crops either as a standard or large pyramid, and rarely gets diseased. A good market Apple.

Washington. — A very fine dessert Apple in use from October to January. Fruit large roundish conical, rich yellow, streaked and mottled with crimson.

The tree makes a better bush than pyramid, but also succeeds as a standard. It requires a warm rich well-drained soil, and is particularly fine when the fruits are ripened under glass.

Wealthy.—A pretty dessert Apple in use from October to January. Fruit medium round, flushed with red, with a tender juicy flavour.

* **Winter Hawthornden.** — A very handsome and valuable cooking Apple in use from November to January. Fruit large, roundish ovoid, flattened and bluntly angular. Skin deep yellow, tinged with green, becoming richer yellow with age, flushed with red, streaked with crimson, and sparingly dotted with russet on the side next the sun.

The tree makes a very fine pyramid or standard and produces heavy crops.

Worcester Pearmain.—A very handsome and sprightly flavoured Apple, in use during August and September, and suitable for either dessert or cooking purposes. Fruit medium, conical, even and very slightly angular towards the crown, brilliant red, freckled with fawn, sometimes with gleams of yellow showing through.

This succeeds well as a bush or standard and bears very freely. Owing to its showy colour and good flavour it is a favourite with market gardeners. It is a seedling from *Devonshire Quarrenden* (p. 1051). As the fruits are often borne near the ends of the shoots, this fact should be remembered at pruning time.

Yellow Ingestrie.—A splendid little dessert Apple in use during September and October. Fruit small, conical or oblong, of a fine clear yellow, somewhat richer on the sunny side, and minutely dotted with pink.

The tree makes a good standard and is very hardy. It is probably the heaviest cropping Apple in cultivation, and notwithstanding its small fruits is a great favourite, having a brisk and highly vinous flavour.

* **Yorkshire Greening.**—A very fine cooking or sauce Apple in use from October to January. Fruit large, flat, slightly angular, dark green, flushed and striped with red on the sunny side, and heavily speckled all over with grey russet.

The tree is a rambling grower and is more suited for a bush than as a pyramid or standard.

The following varieties are not yet largely cultivated, but with the advance of time are likely to become more popular, as they are very promising as regards vigour, hardiness, and flavour.

COOKING APPLES

Beauty of Stoke, *Chelmsford Wonder*, April and May, *Gospatrick*, Oct. to Jan., *Red Bietigheimer*, Oct. Nov., *Royal Jubilee*, Oct. to Jan., *Thomas Rivers*, Sept. to Dec., *Twenty Ounce*, Oct. to Jan., *White Transparent*, Aug.

DESSERT APPLES

Beauty of Bath, Aug. and Sept., *Belle de Boskoop*, Oct. to Jan., *Belle Pontoise*, Dec. to Feb., *Egremont Russet*, Oct. to Jan., *James Grieve*, Oct., *Lord Hindlip*, Jan. to March, *St. Edmund's Pippin*, Sept.

I. List of **Dessert Apples** arranged according to the period of ripening and when fit for use.

NOTE.—Those marked with an asterisk (*) are useful for small gardens. Those marked with a dagger (†) are suitable for market gardening.

July and August.—Joaneting, † * Mr. Gladstone, † * Irish Peach, † Beauty of Bath, † * Devonshire Quarrenden, * Duchess of Oldenburgh.

August and September. — * Lady Sudeley, † * Worcester Pearmain, Kerry Pippin, † King of the Pippins.

September, October, and November.—Yellow Ingestrie, Washington, Cornish Aromatic, Gravenstein, American Mother, † Margil, Court of Wick, † * Cox's Orange Pippin, Ribston Pippin, † * Blenheim Orange.

November, December, and January.—† Brownlees' Russet, Cornish Gillyflower, King of Tompkins County, * Allington Pippin, Adam's Pearmain, * Braddick's Nonpareil, * Scarlet Nonpareil, † Melon Apple, Harvey's Wiltshire Defiance.

December to March.—Mannington's Pearmain, Claygate Pearmain, Reinette de Canada, Fearn's Pippin, Duke of Devonshire.

March to May.—Allen's Everlasting, * Court Pendu Plat, Sturmer Pippin, * Cockle Pippin, D'Arcy Spice.

II. List of **Cooking Apples** arranged according to the period when fit for use. See NOTE under Dessert Apples, p. 1058.

August and September. — Dutch Codlin, † Keswick Codlin, † * Frogmore Prolific, † Lord Suffield, † * Stirling Castle, † Greenup's Pippin, † Jolly Beggar, * New Hawthornden.

October and November. — † * Potts' Seedling, † Cellini, † * Ecklinville, Gloria Mundi, † * Lord Grosvenor, Peasgood's Nonesuch, Manks Codlin, † * Cox's Pomona, Loddington Seedling, † * Grenadier, † * Golden Spire, The Queen, * Small's Admirable, Beauty of Kent, Castle Major, † * Warner's King.

December and January. — † Betty Geeson, Baumann's Reinette, † Blenheim Orange, † Lady Henniker, † * Lane's Prince Albert, Sandringham, † Winter Hawthornden, † * Lord Derby.

February, March, and April.—† * Alfriston, * Golden Noble, † Mère de Ménage, † * Bismarck, † * Bramley's Seedling, † * Dumelow's Seedling, Nelson Codlin, Yorkshire Greening, Beauty of Kent, * Newton Wonder, Wadhurst Pippin, * Hormead Pearmain, † Tower of Glammis, Bedfordshire Foundling, Schoolmaster, * New Northern Greening, Dutch Mignonne.

III. List of Apples suited for cultivation in the north of England and Scotland. Those marked with an asterisk (*) require to be grown on a wall for protection.

Cooking Apples

Cellini, Emperor Alexander, Dutch Codlin, Gloria Mundi, Greenup's Pippin, Hawthornden, Lemon Pippin, Mère de Ménage, Nelson Codlin, Keswick Codlin, Lord Suffield, Manks Codlin, Northern Greening, Alfriston, Bedfordshire Foundling, Blenheim Orange, Dumelow's Seedling, Yorkshire Greening, Tower of Glammis, Warner's King.

Dessert Apples

Devonshire Quarrenden, Irish Peach, Kerry Pippin, Summer Pearmain, Yellow Ingestrie, * Adam's Pearmain, * Braddick's Nonpareil, Court of Wick, * Margil, * Ribston Pippin, * Scarlet Nonpareil, * Sturmer Pippin.

THE PEAR (PYRUS COMMUNIS).—The Pear is very closely related to the Apple, but differs in several important respects. In a wild state it still exists in Britain and the temperate parts of Europe and Asia, and has more or less spiny branchlets. In cultivated specimens, which often reach a height of 40–60 ft. with the trunk a yard or more in diameter, the spines are usually absent. The leaves are simple, ovate, serrate or crenate, smooth above, sometimes downy beneath. The flowers are usually white, rarely tinted with pink, and are borne in corymbs having 8–10 blossoms. The fruit varies a good deal in shape, but usually tapers from the stalk towards the eye, and is thickest about two thirds its length from the stalk—the principal forms being roundish, more or less top-shaped, or obovoid. In flavour and lusciousness it rivals the Peach and Nectarine, but cannot equal the Apple for keeping qualities.

Training.—Pear trees may be grown and trained in the same way as Apples, namely as bushes, pyramids, standards and half-standards, cordons, espaliers &c. (see p. 1035). Against walls, fan-trained trees and cordons are very popular, while in the open ground bushes, pyramids, and espaliers find great favour. Bush Pear trees are very suitable for small gardens, as they are easily attended to in the matter of pruning, gathering, cleansing &c. They may be planted 6–8 ft. or more apart, and need rarely exceed this height when grown on the Quince stock, which has a dwarfing influence. Pyramid trees grow taller, and require a little more space between. Espaliers are valuable as fences and edgings to flower borders, and by the pathways in the kitchen garden. All the branches are well exposed to the sun, and gathering the fruit and cleansing are easily performed.

Soil.—Pear trees will flourish in a rich loamy soil, rather stronger and redder than that for Apples, but requiring to be equally well drained, so as to prevent the accumulation of stagnant water at the roots. Anything approaching a stiff heavy clay should be avoided, until by thorough cultivation by digging or trenching, manuring and draining, it has been brought into a fairly good state. In the case of sandy, shallow soils which have not the power of retaining sufficient moisture for the roots, it is a mistake to plant Pear trees grafted on the Quince stock. The latter is a shallow rooting plant naturally, and is therefore more suitable for rich and rather heavy soils, into the lower depths of which it will not penetrate. The Pear stock on the other hand has an inclination to send its roots deeper into the soil, and trees grafted upon it are best for light dry soils, as they are not so likely to suffer from the effects of dry seasons, owing to the fact that their roots seek moisture at lower depths than those of the Quince.

Protection.—In the north of Scotland and other bleak parts of the British Islands, it is almost essential to grow Pear trees—especially late varieties—upon walls for protection from spring frosts, if anything like a good and regular crop of fruit is annually required. The measures recommended for protecting Apples at p. 1043 are equally applicable to Pears. It is scarcely worth while planting early varieties of Pears against walls, those which ripen later and require some assistance from a good aspect and shelter being more suited for the purpose.

Thinning.—Very often a tree bears a remarkable crop one year, but very few or no fruits at all the following year or two. This is owing chiefly to the fact that in favourable seasons, especially when the plants are on the Quince stock, the large quantity of fruit developed absorbs a good deal of the sap required to form new fruiting branches for the following years. If these fruiting branches or spurs are not duly developed, the tree becomes unfruitful until sufficient force has been gained to produce them again. It is therefore advisable in the interests of the tree itself, and also for the regularity of the crops, that a judicious thinning of the fruit should take place in the same way as recommended for Apples (see p. 1044).

Pruning.—The Pear tree will stand a more severe pruning than the Apple. Judiciously practised, pruning is very beneficial, and chiefly by its means do the trees bear large and luscious fruits. Severe pruning is to be condemned, and the more it is practised on vigorous varieties the more branches and leaves, and the less fruit, are the result. The side shoots may be pinched back to four or five leaves or buds about July, and about November may be cut clean back to about three buds. In the case of short side growths called 'spurs,' as shown in fig. 153, these, if too numerous, must be reduced and not allowed to project too far from the branch. Indeed the same principles of pruning may be applied to the Pear as to the Apple, the gardener always using his best judgment during the operation (see p. 1031). The drawings show the difference between the flower-buds and wood-buds of a Pear tree. It will be noticed that the flower-buds, as

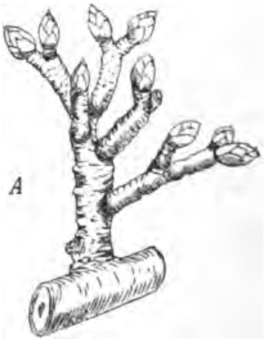

FIG. 153.—FRUIT SPUR OF PEAR.

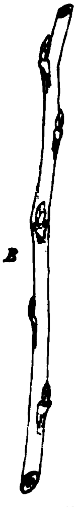

FIG. 154.—WOOD-BUDS OF PEAR.

shown in fig. 153 A, are much plumper than the others shown at B, fig. 154, and when pruning, it is these plump buds that should be left untouched.

Root Pruning is sometimes necessary in the case of Pear trees grafted on the Pear stock, which either induces a strong free growth at the expense of the fruit, or sends taproots down deeply into bad soil. The flow of sap may be checked in the one case and promoted in the other by carefully pruning the roots. The operation is described at p. 1081. Pear trees on the Quince stock rarely require to be root pruned, as the roots usually remain near the surface, and seldom find their way down into the subsoil.

An alternative to root pruning is to frequently lift the trees on the Pear stock when they are young, and spread the roots out carefully in a horizontal position without cutting them. This operation will lay the foundation of a good fibrous root system, and will be of the greatest benefit to the tree in after years. Needless to say, it is useless trying to perform this operation on old trees which have developed large woody roots.

Propagation.—Pear trees may be increased like Apples, by means of seeds, cuttings, layers, budding, and grafting. Seeds are used for raising stocks or new varieties. When the latter object is in view, seeds should be saved only from the very choicest varieties; they are best sown in pots or pans as soon as ripe, and placed in a warm sheltered position out of doors or in cold frames, transplanting the seedlings the following autumn. Seeds of common varieties for grafting stocks may be sown in the open ground in shallow drills, and the seedlings may be transplanted the following autumn, and grown on until large enough to carry a graft.

Cuttings and layers of Pear trees are rarely used at present, but may become more common if the desire for having trees on their own roots increases (see p. 1042).

Budding may be practised in June and July, in dull showery weather if possible, while grafting is done in March or April just as the sap begins to rise. Where the shoots of the stock and scion are about the same thickness, whip- or tongue-grafting is the method employed, but in the case of large stocks and small scions, cleft-grafting is practised.

Stocks.—Pear trees are usually grafted on either the Pear or Quince stock, but occasionally on the Whitethorn, the Mountain Ash, and the Medlar.

The Pear stock, raised from seeds of the wild or common cultivated varieties, produces vigorous trees which live to a great age, but are somewhat slow in coming into bearing. They are suitable for light soils, and for orchards and market gardens, where the same attention cannot be given to trees as in private gardens. In deep and fertile soils Pears on the Pear stock make splendid trees and increase in fruitfulness with age for many years.

Quince stocks are obtained by cuttings, but more frequently by layers. The shoots are bent down and covered with soil during the winter months, and by the following autumn, when well rooted, may be detached and transplanted. The Quince stock usually produces fibrous roots very near the surface, induces a dwarfer growth of the grafted variety, and an earlier ripening of the fruit than does the Pear stock. The latter continues to grow later in the year, and consequently the shoots produced at that period are often immature and useless for fruit bearing. The Quince stock on the other hand induces a slower and steadier growth, so that the branches have time to become well ripened during the season. Although trees upon it do not attain the dimensions and age of those on the Pear stock, still they come into bearing more quickly, and the fruits are usually larger, earlier, better coloured, but not so highly flavoured as those on the Pear stock. As the Quince is not nearly such a quick grower as the Pear, the disparity in the size of the stems at the point of union becomes very marked. To avoid this unsightly appearance, the grafting should be done very low down on the stock near the soil, so as to conceal as much as possible the difference caused by the growth of late years.

INSECT AND FUNGOID PESTS, &C.

Pear trees become diseased from various causes, such as old age, bad planting, cold, wet, undrained soil, bad and severe pruning, excess of manure in direct contact with the roots, want of reciprocity between stock and scion, insects, fungi &c.

Good cultivation, cleanliness, thorough drainage, and proper pruning will, in a great measure, combat these evils. Among the insects which attack the Pear and also the Apple the following may be mentioned.

1. **The Winter Moth** (*Cheimatobia brumata*) and the **Great Winter Moth** (*Hybernia defoliaria*).—The wingless females of these moths crawl up the stems in autumn and early spring and deposit eggs in the cracks of the bark. The caterpillars appear just as the buds are beginning to open, and eat these and the foliage, causing great havoc. The caterpillars of the Winter Moth are at first grey with dark heads and very small. They become greenish with age, having brown heads and white stripes, and ultimately assume a brownish colour, being about ¾ in. long when full grown, with 3 pairs of feet. They make loops with their body when crawling, and glue the leaves and flowers together to form a shelter, destroying them when necessary. When fully developed they drop to the ground by silken threads and bury themselves in it. By October the new moths issue from the chrysalis stage and may be seen in mild weather flitting about up to December.

The caterpillars of the Great Winter Moth are chestnut-brown tinged with yellow beneath and are about 1¼ in. long when full grown.

The ravages of these pests may be checked by placing very greasy bands of paper, rags, hay &c. round the bark in autumn about October so as to catch the wingless females rising from the ground. The bands must be kept in a good condition as long as the pests are about. In spring the trees may be sprayed with Paris green as recommended for the Codlin Moth (see p. 1047). If the caterpillars are actually on the leaves the simplest and most effective remedy is to pick them off by hand into a bucket, and afterwards burn them.

2. **Leopard Moth** (*Zeuzara pyrina*). The caterpillars of this moth, which has white wings heavily covered with steel-blue blotches and dots, sometimes do a great deal of mischief to the young branches of Pears, Apples, and Plums. They feed upon the interior wood but seem to have little effect on the fruitfulness of the tree. In the chrysalis state they remain in the branches and are somewhat difficult to detect, except when the branches happen to be broken and disclose the borings. The moths are on the wing in July and August, and the cylindrical caterpillars about 1½ in. long are covered with black, warty spots on a whitish ground, the head and tail being black. Fortunately they are rarely found in great numbers and seem to do little injury beyond boring tunnels in the young branches. When they are discovered by means of the excreta, wires may be pushed down the tunnels to kill the caterpillars. If the trees were sprayed in summer with a strong solution of soft soap, tobacco-juice, quassia, or any other distasteful mixture, it would probably prevent the moths depositing their eggs. Poisonous mixtures, however, like Paris green should not be used at this season owing to the poisonous deposit being left on the fruits.

3. **Goat Moth** (*Cossus ligniperda*). The caterpillars of this large moth sometimes attack the trunks of fruit and other trees, living on the sound heart wood. Their presence is detected by means of the excreta, and they may be dislodged or killed in the same way as the caterpillars of the Leopard Moth by the insertion of wires.

The moth measures 3–4 in. across, the front wings being ashy brown, netted and veined with darker brown. The hind wings are brown, more or less netted with a deeper shade. It is on the wing in June and July, and the female moth deposits her eggs in the crevices of the bark. One insect is said to be capable of laying 1,000 eggs, so that the increase of caterpillars must be enormous if not checked. The caterpillars eat their way inwards through the wood, and when fully developed are about 4 in. long, and as thick as the finger. They are dark red with breathing holes at the sides, which with the under surface are flesh-coloured, while the head is black. About two years elapse before they become fully developed, and they are then of a light yellow colour.

Where trees become badly bored with these pests, it becomes necessary to cut them down and burn them to effectively destroy the caterpillars.

4. **Diplosis pyrivora** (*Cecidomyia nigra*).—This is a small gnat or midge, the female of which lays its eggs in the blossom buds before they open. The yellow maggots from them burrow into the young fruits and eat the seeds or pips. Afterwards they bore outwards, usually in rainy or damp weather, and conceal

themselves in the soil at the base of the trees. They remain in the chrysalis state until spring, when the new insects appear and the work of destruction begins again. The female insect is only about 1¼ in. long, and is therefore very likely to be overlooked. Sometimes from 20 to 30 maggots infest a single Pear, and the variety *Marie Louise* seems to be a particular favourite with them.

Remedies.—When the fruits show signs of attack by their deformed shape or dropping from the tree, they should be at once collected and burned—not thrown on the rubbish to allow the maggots to reach the chrysalis state.

Spraying with Paris green in spring and adopting the measures recommended for the Codlin Moth at p. 1047 will prove effective—if the pest is not allowed to flourish in neighbouring gardens.

Various other insects occasionally attack the Pear tree, but as a rule, where steps are taken to destroy or prevent any of the preceding pests, the remedies are effectual for any others that may happen to be present. In this connection the reader is referred to the insect enemies of the Apple (p. 1046).

Canker, mildew, cracking, and other fungoid diseases of the Pear tree are brought about by bad cultivation very often as in the Apple tree, and the same remedies must be adopted. Mosses, lichens, and other low vegetable organisms may be removed by the caustic soda and potash solution recommended at p. 1046.

VARIETIES OF PEARS TO GROW

There are about 700 or 800 varieties of Pears which have at one time or another received names, but there must be at least as many more unnamed varieties. Very few, however, are worthy of cultivation from the amateur's point of view. *Beurré Superfin*, *Beurré Diel*, *Doyenné du Comice*, *Durondeau*, *Josephine de Malines*, *Pitmaston Duchess*, *Jargonelle*, *Williams' Bon Chrétien*, *Louise Bonne of Jersey*, *Marie Louise d'Uccle*, *Souvenir du Congrès*, and one or two others being probably the very best.

In the selection given below only the finest flavoured varieties are described. Those most suitable for stewing are marked with an asterisk (*).

Autumn Nelis.—This fine Pear is ripe in September and October, and has a sweet rich musky flavour. It must, however, be eaten soon after gathering, as it soon decays. Fruit small, roundish, top-shaped, entirely covered with brown russet, with a patch of greenish-yellow here and there.

The tree is very healthy and vigorous and bears freely

Baronne de Mello. — This excellent Pear is very juicy and rich in flavour, and is usually ripe at the end of October and lasts sometimes well into November. Fruit elongated top-shaped, almost entirely covered with dark brown thin smooth russet, greenish-yellow mottled with russet on the shaded side.

A hardy, vigorous, but not rank-growing tree. Grows well on the Quince, and is suitable for cordons, pyramids, or bushes. It is an excellent cropper.

Belle Julie.—A very delicious juicy Pear with a sugary vinous flavour; ripe at the end of October. Fruit medium, long obovoid, even and regular in shape, roughish, with large russety specks, dull brown flushed with a reddish-brown on the sunny side, greenish on the shaded side.

The tree thrives as a pyramid or cordon, and bears very heavy crops of fruit.

* **Bellissime d'hiver.** — A very fine stewing Pear, having a tender sweet and musky flavour, and quite free from grittiness; it is in use from November to April. Fruit very large, roundish top-shaped, smooth, deep shining green on the shaded side, changing to lemon-yellow, the sunny side being flushed with a rich vermilion or rosy-red.

The tree grows vigorously either on the Pear or Quince stock, and makes a good standard.

Bergamotte Esperen. — A delicious late Pear fit for use from the middle of February until April. It has a yellowish fine-grained flesh, quite melting, very juicy and sugary, and pleasantly flavoured. Fruit medium, roundish irregular, with a coarse and rough skin, at first dark green with large brown russet dots, becoming greenish-yellow with maturity, and sometimes flushed with orange on the sunny side.

The tree forms a handsome pyramid. It succeeds well on the Quince stock, and bears heavy crops, although in some parts the fruit does not ripen well. When grown as a cordon against walls excellent fruits can be obtained.

Beurré d'Amanlis. — A fine tender juicy and melting Pear, with a rich sugary flavour; ripe in the middle of September. Fruit large, roundish obovoid, irregular in outline at first, bright green tinged with brown next the sun, patched and dotted with russet, becoming yellowish-green with ripeness, and reddish-brown next the sun.

Although the fruit may not equal some others in flavour, this variety is worth growing on account of its hardiness and great fruitfulness. It succeeds in almost any good soil either on the Pear or Quince stock, and is suitable for standards or pyramids.

Beurré d'Anjou.—An excellent, very tender-fleshed, buttery and melting Pear, with a vinous flavour and agreeable perfume. It is ripe at the end of October and lasts till January. Fruit large, roundish obovoid, even in outline, greenish-yellow, sometimes flushed with red next the sun, flaked with russet, and thickly dotted with brown and crimson.

The tree forms a handsome pyramid, and makes a fine cordon on walls, thriving best on the Quince stock.

Beurré Benoit.—A fine melting Pear with a very juicy, sub-acid flavour; ripe in September and October. Fruit large, obovoid, pale yellow flaked and dotted with pale brown russet.

The tree succeeds well on either the Pear or Quince stock, and makes a good pyramid. It is a good cropper, but in some localities the fruit occasionally lacks flavour.

Beurré Bosc.—A delicious and richly flavoured Pear ripe in October and November. Fruit large, oblong obovoid, almost entirely coated with thin cinnamon-brown russet, with small patches of greenish-yellow visible here and there.

The tree is a great bearer and is very often double grafted (see p. 57). It forms a medium-sized pyramid, but is usually best grown against a wall trained as a cordon or dwarf bush.

Beurré Capiaumont.—A delicate and well-flavoured Pear ripe in October. Fruit medium, bluntly obovoid, pale yellow in the shade, coated with cinnamon-brown russet, speckled with grey, and flushed with reddish-orange on the sunny side.

The tree is hardy and vigorous, and a very heavy cropper. It succeeds in northern parts of the kingdom, as a standard, pyramid, or cordon on the Quince stock.

*** Beurré Clairgeau.**—This handsome and showy Pear is probably more suitable for stewing than for dessert, and it is useful for either according to taste, being in use during November. Fruit large, oblong obovoid, curved, smooth and shining lemon-yellow, tinged with orange-red next the sun, and heavily dotted and patched with thin russet, especially near the stalk.

The tree is a very vigorous grower and great bearer. It is often double grafted and forms a medium-sized pyramid and bush; also a good cordon. A good variety for market.

Beurré Diel.—A deliciously flavoured Pear ripe in October and November. Fruit large obovoid, pale green at first, changing to yellow, dotted and marked with russet.

The tree is hardy and vigorous, and bears heavy crops. It succeeds best on the Quince stock as a bush, and may also be grown in orchards as a standard. Against a wall it produces excellent fruit of the largest size.

Beurré Dumont.—A richly flavoured Pear with a fine musky flavour; ripe during November and December. Fruit medium, roundish ovoid, greenish-yellow speckled with brown russet on the shaded side, and flushed with reddish-brown next the sun.

The tree makes a medium-sized pyramid and also a good cordon on the Quince stock.

Beurré Fouqueray.—An excellent and very juicy Pear ripe during October and November. Fruit large and handsome, obovoid, greenish-yellow, coated with thin russet.

The tree is very hardy and bears heavy crops, especially when grown as a pyramid on the Quince stock.

Beurré Giffard.—A fine early Pear with a juicy vinous and highly aromatic flavour; ripe in the middle of August. Fruit medium, oblong-obovoid, or top-shaped, greenish-yellow, mottled with red on the sunny side.

The tree succeeds on the Pear or Quince stock, and makes a fine spreading bush or pyramid. It may also be trained as a cordon.

Beurré Hardy. — This is a very fine and highly perfumed Pear of excellent flavour and quality; ripe in October.

Fruit large and even, oblong-obovoid, shining yellowish-green, thickly dotted with russet, and coated with brown round the stout fleshy stalk and large open eye.

The tree forms a fine pyramid on either the Pear or Quince stock, with a compact habit of growth, and bears heavy crops in most seasons. A good variety for market.

Beurré Rance.—An excellent juicy and richly flavoured Pear ripe in December, but lasting well from February to May. Fruit varying from medium to large, oblong obovoid, dark green, covered with large dark brown russety spots.

The tree is hardy, vigorous, and a heavy cropper. It succeeds as a standard, and also makes a fine pyramid. In the north of England and Scotland it requires the protection of a wall. It is often double grafted.

Beurré Superfin.—This is one of the most delicious and juicy Pears grown, and is ripe in September and October. Fruit above medium size, obovoid or top-shaped, somewhat uneven in outline, greenish-yellow, becoming lemon-yellow with maturity, and covered with thin patches and veins of cinnamon russet.

The tree is not a large grower, but bears abundantly on either the Pear or Quince stock, and is excellent as a cordon on the latter.

Bishop's Thumb. — A fine old Pear with a rich juicy and vinous flavour; ripe in October. Fruit large, narrow oblong obovoid, with a wavy outline, yellowish - green, covered with large russety dots, and flushed with brownish-red next the sun.

The tree is very hardy and free growing. It forms a medium-sized pyramid or standard, and bears heavy crops. It is suitable for market gardens and orchards, and is often double grafted.

* **Catillac.**—This is one of the best stewing Pears, in use from December to April. It is, however, often suitable for dessert. Fruit very large, flatly top-shaped, at first pale green, becoming a beautiful bright lemon-yellow, tinged with brownish-red next the sun, and thickly studded with large brown russety dots.

The tree grows freely and bears abundantly, and is best grown as a dwarf owing to the size of its fruits, which should be allowed to hang late before gathering.

Chaumontel.—A fine richly flavoured and highly perfumed Pear in use from November till March. Fruit large, oblong or bluntly obovoid, irregular and wavy in outline, knobbed or ridged round the apex. Skin yellowish - green, heavily spotted and flaked with russet, and flushed with brownish-red next the sun.

This variety requires to be grown on a rich warm soil to bring its rich melting flavour to perfection. In heavy soils and cold situations the flesh becomes gritty and bitter, but may then be used for stewing. In warm places it may be grown as a standard, but in cold spots it is best on a south or south-west wall, where it may be trained as a cordon.

Clapp's Favourite. — A handsome American Pear with a rich juicy brisk flavour. The fruit is ripe about the middle of August and should be eaten from the tree, as it becomes mealy when kept. Fruit medium, long obovoid, symmetrical and even in shape, green at first, becoming fine yellow, and reddish - crimson with deeper crimson stripes next the sun.

The tree flourishes on the Quince stock, and may be grown as a bush, pyramid, cordon, or espalier.

Comte de Flandre.—A delicious rich and sugary Pear ripe in November and December. Fruit very large, tapering obovoid, almost entirely covered with large freckles of cinnamon - coloured russet.

The tree is often double-grafted on the Quince stock, and makes a good pyramid or cordon.

Comte de Lamy. — A luscious and highly flavoured Pear, ripe in October. Fruit below medium size, roundish obovoid, yellowish - green, flushed with brownish-red on the sunny side, and dotted with russet.

The tree is a free and hardy grower, and a very heavy cropper, especially in southern parts. It forms a medium-sized bush or pyramid, and may also be trained as a cordon.

Conference. — This is a comparatively new Pear, with a rich, melting, and very juicy flavour, ripe in November and December. Fruit large, tapering obovoid, bright yellow for about an inch beyond the stalk when ripe, afterwards bright russet.

Doyenné Boussoch. — A handsome well-flavoured Pear, ripe in October, and requiring to be eaten before becoming too ripe. Fruit large, roundish obovoid, lemon-yellow, covered with large, rough, russety dots.

The tree forms a handsome pyramid, but is also good as a bush or espalier, and prefers to be grafted on the Quince. It seems to produce more highly flavoured fruits in southern parts of the kingdom.

Doyenné du Comice.—A juicy sweet and exquisitely flavoured Pear, ripe at the end of October and lasting during November. Fruit large, tapering obovoid, sometimes rather uneven in outline, lemon-yellow, tinged with green, more or less heavily speckled and flaked with pale brown russet especially round the eye and stalk.

In southern localities the tree makes a fine bush or pyramid on the Quince stock, and produces highly flavoured fruit. In northern parts it requires a wall, but the fruit is then not of such fine flavour.

Duchesse d'Angoulême.—In good seasons this is a fine and highly flavoured Pear, ripe in October and November. Fruit very large, roundish obovoid, very uneven and wavy in outline, greenish-yellow, changing to dull yellow, veined and freckled with pale brown russet, sometimes flushed with brown on the sunny side.

The tree is best grown as a pyramid or cordon on the Quince stock, but it also succeeds well on the Pear stock. When thinned out, the fruit allowed to ripen often attains a great size. It requires a very warm situation.

Durondeau.—A beautiful, tender and highly flavoured Pear ripe at the end of October and beginning of November. Fruit large, regular, bluntly oblong, obovoid, glossy, as if varnished, on the sunny side, which is bright crimson, streaked with a deeper tint and covered with large grey russety dots; yellow on the shaded side, thinly coated and dotted with cinnamon russet.

The tree forms a fine pyramid, and also succeeds as an espalier or cordon on either Pear or Quince stock. It usually bears freely, but is better flavoured in some localities than others.

Easter Beurré.—A delicious, melting and very juicy Pear in use from January to March. Fruit large, obovoid, at first pale green, changing to yellowish-green, thickly dotted with russet, sometimes with a brownish tinge on the sunny side, and patches of thin brown russet round the stout stalk and small eye.

The tree is hardy and a great cropper. It is often double grafted on either the Pear or the Quince stock, but on the latter makes a medium-sized pyramid and also a good cordon. The fruit is best picked before it is quite ripe. In heavy soils and cold situations it loses a good deal of its fine flavour.

Emile d'Heyst.—A finely perfumed and very juicy Pear with an exquisite flavour. It is usually ripe at the end of October but does not keep very long. Fruit above medium size, oblong obovoid, wavy in outline, bright yellow when ripe, flaked and veined with cinnamon russet.

The tree is a strong grower and bears very freely on the Quince stock. It may be grown as a medium-sized pyramid or standard and is useful for orchard and market garden culture.

Fondante d'Automne.—A melting, juicy, deliciously flavoured and perfumed Pear, ripe in September and October. Fruit large, handsome, obovoid, lemon-yellow, tinged with green, and flaked with yellow-brown russet.

The tree forms a large handsome pyramid and succeeds on either the Pear or Quince stock. It is useful for orchards and market gardens, especially in southern districts.

General Todleben.—A rich juicy and highly flavoured Pear in use from December to February. Fruit very large, oblong obovoid, ribbed round the apex, yellow in colour, dotted and flaked with brown russet.

The tree is a moderately vigorous grower but bears abundantly, and forms a handsome pyramid on the Quince stock. It may be regarded as a failure on cold damp soils. The fruit is also suitable for ordinary purposes, in localities where it does not ripen freely.

Glou Morceau.—A rich and delicious Pear of good quality in use from December to January. Fruit above medium size, obovoid, smooth and somewhat irregular in outline, pale greenish-yellow, dotted with greenish-grey russet.

The tree as a general rule makes a fine pyramid or standard, and grows vigorously on the Quince stock, but must have a warm rich soil and sheltered situations. In cold localities it must be sheltered by a wall.

Hacon's Incomparable.—An excellent highly flavoured and perfumed Pear, in use from November to January. Fruit medium, roundish, pale yellowish-green and brown, more or less heavily spotted and marked with russet.

The tree forms a handsome and fruitful pyramid on the Quince stock, and also succeeds well as a standard. It does not, however, always fruit freely on the Pear stock.

Jargonelle.—A well-known Pear, ripe in August, with a rich, very juicy and vinous flavour. Fruit large, oblong obovoid, smooth, greenish-yellow, flushed with brownish-red on the sunny side.

The tree is a strong, healthy, and vigorous grower, with drooping shoots. It succeeds well as a standard, and also makes a grand pyramid. In northern parts it requires the protection of a wall, but in many southern districts the fruit lacks flavour from trees thus grown.

Jersey Gratioli.—A juicy, sweet and highly flavoured Pear of the best quality, ripe in October. Fruit above medium size, roundish obovoid, greenish-yellow, studded with large, rough, russety spots, and flushed with pale brown on the sunny side.

The tree is very hardy and vigorous and succeeds and fruits freely as a standard. It is suitable for market gardening and orchards.

Josephine de Malines.—This melting, rich, juicy, and deliciously flavoured Pear is considered to be one of the finest grown. The medium-sized fruit is in use from January till March, yellow in colour, tinged with green on the shaded side, and red on the sunny side, the whole surface being covered with large russety dots.

The tree is hardy, vigorous, but somewhat straggling in growth, and a heavy cropper. In the south it may be grown as a bush or pyramid, but in the north it requires a wall. The trees should nearly always be double grafted (see p. 57).

Louise Bonne of Jersey.—A handsome juicy Pear of excellent flavour, ripe in October. Fruit medium, oblong obovoid, smooth, yellow on the shaded side, but crimson next the sun, dotted with crimson and russet.

The tree forms a good pyramid or bush on the Quince stock and usually bears well. In the north and cold localities it should be grown on a wall. A good variety for market, as it is not only beautifully coloured and highly flavoured, but in extra good seasons produces exceptionally fine crops.

Madame Treyve.—A handsome, melting and richly flavoured Pear, ripe from the middle of September. Fruit large, bluntly obovoid, sometimes a little irregular in outline, greenish-yellow, changing to pale yellow on the shaded side, but bright vermilion-crimson on the side next the sun, and dotted with grey-russet.

The tree forms medium-sized pyramids and also good standards on the Quince stock, and is useful for orchards and market gardens.

Maréchal (or **Conseiller**) **de Cour.**—A deliciously flavoured and highly perfumed Pear, ripe from the end of October. Fruit large, oblong obovoid, slightly wavy in outline, heavily covered with cinnamon-russet, with here and there a little pale yellow showing through.

The tree is hardy, free growing, and a heavy cropper. It forms fine pyramids on the Quince stock, and is equally good as a standard.

Marie Benoist.—A rich juicy Pear with a briskly perfumed flavour, fit for use in January and February. Fruit large, obovoid, irregular in outline, heavily covered with brown russet and mottled with yellowish-green.

The tree is a medium grower, but a heavy cropper, and makes a good cordon against walls in the north, or a small pyramid or bush on the Quince stock in the south.

Marie Louise.—One of the finest and most richly flavoured Pears, ripe in October and November. Fruit large, oblong obovoid, smooth pale green, becoming yellow with maturity, and marked with thin brown russet.

The tree is hardy and free growing, and when grown against a wall produces one of the finest Pears known. It also succeeds as a standard and large pyramid, but the fruit from these is somewhat smaller, though often of a better flavour than on walls. The trees are often double-grafted, and unfortunately while they are usually covered with a mass of blossom in spring, they do not always bear good crops.

Marie Louise d'Uccle.—A juicy and richly flavoured Pear, ripe in the middle of October. Fruit rather large and handsome, obovoid, coated with pale cinnamon-russet.

The tree grows vigorously on the Quince stock and makes a very good bush or pyramid or standard. Although not so fine as the old *Marie Louise*, it is a far superior cropper, being remarkably prolific.

Nouvelle Fulvie.—A very juicy Pear with a rich and delicious flavour, ripe from November to February. Fruit medium, tapering obovoid, somewhat irregular in outline, green in colour, changing to yellow, and thickly dotted all over with russet, having a reddish-crimson flush on the sunny side in good seasons.

The tree is hardy and free in growth, and on the Quince stock forms a medium-sized pyramid, and also makes a good cordon. The flavour of the fruit varies somewhat according to locality, being more luscious in some than in others.

Olivier de Serres.—A grand late Pear in use during February and March, and having a brisk vinous flavour and rich musky perfume. Fruit medium, roundish and more or less flattened and irregular in outline, entirely coated with cinnamon-russet.

The tree forms a handsome pyramid, as well as a good standard or cordon on the Quince stock, and usually bears well. It also succeeds on the Pear stock.

Passe Colmar.—A splendid melting and richly flavoured Pear, in use during November and December. Fruit medium, more or less bluntly obovoid, smooth, bright green at first becoming a uniform deep lemon-yellow, flushed with reddish-brown next the sun, and dotted and veined with russet.

The tree, although a hardy and vigorous grower, requires to be grown in a rich warm soil, or on a wall in the north and cold situations. It forms a handsome pyramid and bears abundantly. It is very suitable for orchards and market gardens, in the best situations, and on the Quince stock makes a medium-sized pyramid, and also a good cordon.

Passe Crassane.—This excellent Pear, with a peculiar and agreeably aromatic flavour, is in use from January to March. Fruit medium, roundish obovoid or top-shaped, ridged and furrowed round the eye, entirely coated with dark brown russet, but tinged with yellow on the shaded side.

The tree is often double grafted, and in the north or cold localities must be grown on a wall. In some districts it lacks a good deal of flavour.

Pitmaston Duchess.—A very handsome richly flavoured and delicately perfumed Pear of the best quality, in use from the end of October and during November. Fruit very large, oblong obovoid, a little wavy in outline, and sometimes bluntly bossed, with a smooth pale lemon skin, thickly flaked with cinnamon-brown russet, especially round the stalk.

The tree is a very strong grower and makes good pyramids, bushes, espaliers, or cordons, but owing to the great size of the fruit is scarcely adapted for growing as a standard. The fruit, besides its value for table, is also good for stewing. Where this variety grows well it is a fine Pear for market work.

Seckle.—A delicious little Pear with a rich powerful aromatic flavour, ripe in October. Fruit small, obovoid, regular in outline, dull brownish-green, becoming more yellow with maturity and flushed with bright red on the sunny side.

The tree is very hardy, vigorous, and a heavy cropper. On the Pear stock it makes a fine pyramid, and on the Quince a good cordon. It is well adapted for orchards and market gardens.

Souvenir du Congrès.—An excellent, juicy, and highly perfumed Pear, ripe from the end of August and during September, and somewhat resembling *Williams' Bon Chrétien*, from which it is a seedling. Fruit large, oblong obovoid, wavy in outline, thickly covered with smooth cinnamon-brown russet, with here and there patches of yellow, and streaks of bright crimson flushed with brown on the sunny side.

When grown against a wall the fruits are very fine. The tree also forms a good-sized pyramid and standard; and on the Quince stock also a good cordon.

Thompson's. — A melting, highly flavoured and delicious Pear, ripe in November. Fruit medium, obovoid, pale yellow, coated and dotted with pale cinnamon-brown russet.

The tree is quite hardy and a heavy cropper, succeeding best on the Pear stock. It is useful for orchards and market gardens.

* **Uvedale's St. Germain.**—An excellent stewing Pear, in use from January to April. Fruit very large and heavy, oblong obovoid, irregular, smooth dark green, changing to yellowish-green, dull brownish-red on the sunny side, covered with bright brown dots and traces of russet.

The tree forms a large pyramid, but

also succeeds as a cordon. It is often double grafted, and is a heavy cropper.

* **Verulam.**—An excellent and richly flavoured stewing Pear, in use from January to March. Fruit large, obovoid, dull green, thinly coated with russet on the shaded side, flushed with reddish-brown, and heavily dotted with grey next the sun.

The tree is a very strong grower and an abundant bearer. It forms a large pyramid, and is also good as a standard. In good favourable seasons the fruit is fit for dessert use.

* **Vicar of Winkfield.**—A good stewing Pear, in use from November till January, and also suitable for dessert when grown in good situations and favourable seasons. Fruit very large, oblong obovoid, often one-sided, smooth, greenish-yellow, tinged with red on the sunny side, and dotted with green and grey russet.

The tree forms a large pyramid, and also a good standard.

Williams' Bon Chrétien.—A rich juicy and deliciously flavoured Pear with a strong agreeable aroma, ripe in August and September, but will not keep long. Fruit large, bluntly oblong obovoid, irregular and wavy in outline, smooth pale green, becoming clear yellow with ripeness, and streaked with red on the side next the sun.

The tree is a hardy and vigorous grower, but irregular and not free in producing its fine fruits. The latter should be gathered before they are ripe, when in the greenish-yellow stage, as they soon decay. They also lose a good deal of their delicious flavour if allowed to hang until the fruit parts readily from the tree. The trees grow well on the Quince stock, and make fine fruitful pyramids or standards in favourable situations, but they seem to be more fruitful as cordons in some localities. The present season (1900) has been an exceptionally good one for 'Williams' Pears.

Winter Nelis.—A melting, rich, and deliciously flavoured Pear, with a fine aroma, in use from November to February. Fruit below medium size, roundish obovoid or top-shaped, dull green, changing to yellowish-green, dotted and flaked with brown-russet, especially on the sunny side.

The tree succeeds well on the Quince, and forms a handsome pyramid and a good cordon. It is quite hardy and bears abundantly.

Select list of **Dessert Pears** arranged according to the period of ripening, those marked with an asterisk being particularly suitable for small gardens.

July and August.—Beurré Giffard, Clapp's Favourite, * Jargonelle, * Williams' Bon Chrétien.

August and September. — * Beurré d'Amanlis, Fondante d'Automne, Madame Treyve, Souvenir du Congrès.

October. — * Beurré Hardy, Beurré Superfin, * Comte de Lamy, * Doyenné Boussoch, * Emile d'Heyst, * Louise Bonne of Jersey, * Maréchal de Cour, * Marie Louise, * Pitmaston Duchess, Seckle.

November and December.—* Doyenné du Comice, Duchesse d'Angoulême, Glou Morceau, Hacon's Incomparable, Passe Colmar, * Thompson's.

January and February. — Beurré Sterckmans, * Josephine de Malines, * Marie Benoist, * Nouvelle Fulvie, Passe Crassane, * Winter Nelis.

March and April.—Bergamotte Esperen, * Beurré Rance, * Easter Beurré, Olivier de Serres.

Stewing or Baking Pears

Bellissime d'Hiver.	Nov. to April.
* Beurré Clairgeau.	Nov.
* Catillac.	Dec. to April.
Uvedale's St. Germain.	Jan. to April.
* Verulam.	Jan. to March.
Vicar of Winkfield.	Nov. to Jan.

THE PLUM (Prunus domestica). The cultivated Plum has probably originated by the natural crossing and intercrossing at remote periods of various more or less distinct varieties or species. Thus *P. domestica*, *P. insititia* (the Bullace), and *P. spinosa* (the Blackthorn or Sloe) have no doubt all contributed to produce the modern Plum.

The Plum is one of the hardiest and most useful fruits for cultivation in the British Islands, and notwithstanding the fact that it belongs to the Rose Family, like the Apple and Pear, it differs from these in its fruit (called a drupe) having a stone or nut embedded in a fleshy pulp. The trees reach a height of 15–20 ft. with spreading heads, and produce their masses of pure white blossom earlier than either Apples or Pears in the spring time. For the botanical details of the genus the reader is referred to the description of *Prunus*, p. 356.

Training. — Plums may be trained against walls as fans or cordons, or horizontally like Apples and Pears, and in the open ground as bushes, pyramids, standards, and half-standards (see p. 1035).

The distance at which the trees may be planted is the same as for Apples and Pears, according to the style of training adopted, but Plums are always better planted in the autumn than in the spring.

Soil.—A good loamy well-drained soil on a gravelly or chalky bottom will grow excellent Plums. The various operations for keeping the ground in good condition and fertility (see p. 68) must always be attended to, not only for the sake of the trees and the crops they produce, but also because they are a great check against the ravages of insect pests and fungoid diseases. As the Plum is inclined to produce masses of leafy growth if the soil is rendered too rich by the addition of copious supplies of manure, it is best to keep the soil fairly light, but at the same time sufficiently moist to stand the strain of very hot summers. Where Apples, Pears, Plums, and Cherries are all grown together in the same land, the same treatment and manuring of the soil will do for all, and an autumn and spring dressing of superphosphate, nitrate of potash, nitrate of soda, and sulphate of potash (see p. 74) will prove highly beneficial.

Protection.—Where the choicest and best fruits are required, Plum trees should if possible be grown on a wall facing either east or west especially in the colder parts of the kingdom. They are thus protected from severe and chilling winds in spring, and the radiation of heat from the walls serves to ripen the fruits earlier, and give them a finer colour and a more luscious flavour.

Pruning.—The pruning of Plum trees is exactly the same as that for Apples and Pears, care always being taken not to be too severe in the cutting. The summer pruning of the young shoots by cracking or breaking them halfway through (see p. 1034) is to be particularly recommended in the case of Plums, as experience has proved it to be useful in preventing what is known as 'gumming.' Summer pruning also has the effect of allowing more elaborated sap to be drafted into the swelling and ripening fruits, thus increasing their size, colour, and flavour. The illustration (fig. 155) shows the difference between the flower-buds (*f*) at A and leaf-buds (*w*) at B, the latter, as in other fruits, being much less plump than the former.

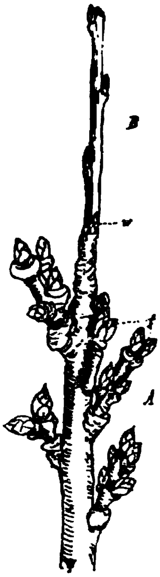

FIG. 155.—PLUM.

Thinning the fruits as recommended for Apples (p. 1044) is also advantageous, especially where the very finest fruits are desired. In good seasons Plum trees bear enormous crops, and if the fruit is not thinned out, many of the branches are almost sure to be broken down, and the fruit they bear will be lost, while those left will be only of medium size and not so highly flavoured or coloured as if they had been thinned out in spring.

Root-pruning.—It is a common complaint against Plums that they often make any amount of top-growth but yield very little fruit. This is often brought about by too rich a soil in which the roots revel and pump vast supplies of sap into the branches, and also by severe pruning. This tendency to excessive top-growth and sterility may be checked and remedied by attention to pruning the roots (see p. 1031) and proper and not over-pruning of the branches.

Preserving Plums. — The value of Plums for jams, preserves &c. is well known. In the form of Prunes, as imported from France, they are also very valuable, and when a glut exists the fruits may be carefully dried and kept for a considerable time. An easy and excellent way to dry Plums for preserving is to place them in a perforated tray or sieve in an ordinary oven at night-time when the fire is allowed to extinguish itself gradually. By the morning they will have shrivelled somewhat, but the skins will have become toughish in texture and more or less impervious, and thus preserve the interior flesh for a long time. Placed in water they swell up gradually and are fairly good eating, while for tarts &c. they are excellent.

Propagation. — Plums are usually increased (i) by cleft grafting during February and March, and also about the end of August and during September; and (ii) by shield budding in July during dull showery weather. The stocks chiefly used are the Damson, the Mussel, St. Julien, and White Pear Plum; but of late years a good deal of attention has been directed to the Myrobalan Plum (*Prunus mirobalana* or *P. cerasifera*) and also to the 'Mirabelle' Plum, a variety of *Prunus communis*, as stocks valuable for dwarfing the plants and increasing their fertility. As some confusion exists in regard to these two Plums owing to the great similarity of the names, it may be as well to state that the 'Myrobalan' Plum Tree is described at p. 858 under the name of *P. cerasifera.* It may be increased by means of seeds and cuttings, and flourishes in dry and rather calcareous soils. The 'Mirabelle' is a variety of the common Wild Plum described at p. 859 as a variety of *P. communis*. There are several forms of it cultivated in France for the sake of the fruits. It may be increased by seeds and cuttings, and may be used on the 'Myrobalan' as an intermediate stock for double grafting so as to restrain the vigour of the latter somewhat.

The stocks are obtained by sowing the 'stones' in open air beds in autumn, and allowing the seedlings to remain until the following autumn before transplanting. When large enough for grafting the stocks are cut back close to the ground in January. The scions or grafts are also cut at the same period and stuck in the soil until the time for grafting is at hand. In the case of standards as well as other forms, the graft is inserted close to the ground, and allowed to make its own stem on which the head is eventually to be formed.

Budding is now becoming more general than grafting for Plums and other stone fruits like Cherries, Peaches, Nectarines &c., but care must be taken to see that wood and not blossom buds (see illustration, fig. 155) are inserted when the operation is performed.

Plums may also be raised from seeds when new varieties are desired. Suckers may also be used, but are not advisable as all suckering Plums are a great nuisance in a garden. Layers and cuttings are rarely used, but where Plums are required on their own roots these methods of propagation may be practised as described under the Apple (p. 1044).

Insect Pests, diseases &c.—The most injurious of these have already been alluded to under Apples and Pears (see pp. 1046, 1062), and the various remedies described will prove equally beneficial in the case of Plums. Good cultivation, good drainage, and cleanliness are always excellent preventives. Various kinds of Aphides which secrete a sticky fluid over the foliage are sometimes very much in evidence, but may be removed by the application of a solution of soft soap and quassia, in the proportion of about 1 lb. of each to 4 gallons of water, with tobacco juice or a little paraffin added, applied warm or hot up to 120°–150° Fahr.

Slugworms are sometimes very troublesome, and may be dealt with as advised at p. 1048.

The larvæ of the Plum Weevil (*Rhynchites cupreus*) and the Plum Tortrix (*Carpocapsa funebrana*) sometimes attack the young fruits and do a good deal of damage. In the chrysalis state they remain in the ground at the base of the tree, emerging as perfect insects to lay their eggs in spring. The remedies mentioned under the Apple Blossom Weevil at p. 1046 will be found useful in dealing with these and other pests of similar habits.

The disease known as 'gumming' may be prevented largely by judicious summer and autumn pruning (see p. 1081).

A peculiar disease known as 'Silver Leaf' often attacks the Plum, causing the leaves to assume a dull lead-like sheen. This is a sure sign that they are going to die, although they may linger for one or two seasons. It is very prevalent in some market gardens, and is probably due to some unsuitable condition of the soil, which sets up a fungus disease. When the trees are rooted up, as they should be, it is better not to replace them with Plums, but Apples have been found to thrive in their places.

Varieties of Plums and Gages to grow.—The following selection includes the best varieties of Plums and Gages suitable for dessert and cooking. The Damsons and Bullaces are treated separately immediately afterwards for the sake of convenient reference.

Archduke. — A very fine late Plum, suitable for cooking purposes, and ripe about the middle of September. The fruit is large, oval, and purple in colour, and is valuable on account of its lateness.

The tree is very hardy and fruitful, and succeeds as a pyramid, bush, or trained on a wall.

Autumn Compôte.—An excellent cooking Plum, ripe at the end of September, and valuable for preserving. Fruit large, oval, bright red, tender, juicy, and well-flavoured.

Belgian Purple.—A fine Plum, ripe in the middle of August, and suitable either for cooking or dessert. Fruit medium, roundish, deep purple-red, covered with a bluish bloom.

The tree is a compact grower and heavy cropper, and forms a good pyramid or cordon.

Blue Impératrice.—A valuable Plum, ripe in October, having a particularly sweet and rich flavour if allowed to hang on the tree until it shrivels. Fruit medium, obovoid, tapering towards the stalk, deep purple covered with a thick bluish bloom.

The tree bears well, and is better adapted for wall culture facing east or south-east. Although a Dessert Plum the fruit is excellent for cooking.

Brahy's Greengage.—A rich, melting, and highly flavoured Greengage, ripe about the end of September. Fruit very large, roundish, with a distinct channel, yellowish-green, covered with a rich bloom.

Bryanston Gage.—An excellent finely flavoured variety, said to be a cross between the old *Green Gage* and Coe's Golden Drop. It is ripe about the middle or end of September. Fruit very large, roundish, yellowish-green becoming deeper yellow with ripeness, dotted with crimson and covered with a pale bloom.

The tree is a medium grower, and may be grown as a bush or standard in warm soils, or may be trained on a wall.

Coe's Golden Drop. — A rich and deliciously flavoured Plum, ripe about the end of September, and suitable for dessert or preserving. Fruit very large, oval, pale yellow, dotted with dark red. The fruit should be allowed to remain on the tree long after it is ripe, to enhance its richness of flavour.

The tree is not a vigorous grower, and is best trained on a wall as a rule. The fruit will hang on the trees for some time after being fully ripe, but it must be protected from wasps.

* **Cox's Emperor.**—A good cooking Plum of the Orleans or Pond's Seedling type, ripe in the middle of September. Fruit large, roundish oval, deep red.

The tree is a strong grower and good cropper.

* **Czar.**—A fine cooking Plum, ripe early in August. Fruit large, oval, dull red, becoming blackish when dead ripe, coated with a thin bluish bloom which gives it a bright purple appearance.

The tree is a hardy and vigorous grower, bears abundantly, and the fruits do not crack. It is suitable for orchards and market gardens.

Denniston's Superb. — A deliciously flavoured dessert Plum, ripe about the middle of August. Fruit above medium size, roundish, pale yellowish-green, faintly blotched and dotted with purple, and coated with a thin bloom.

The tree is a good cropper, and is well suited for pyramids or cordons.

* **Diamond.** — A juicy and briskly flavoured cooking or preserving Plum, ripe about the middle of September. Fruit very large, oval, deep purple approaching black, covered with a pale bluish bloom.

The tree grows vigorously, and bears well. It forms a fine pyramid.

Early Transparent Gage.—An excellent dessert Plum, ripe early in August, fruit rather large, roundish and flattened, greenish, becoming yellowish-green when fully ripe, mottled with crimson on the sunny side.

The tree is hardy and bears abundantly; it may be grown as a pyramid or cordon.

* **Gisborne.**—A well-known and excellent cooking Plum, ripe about the middle of August. Fruit rather below medium size, roundish oval, greenish-yellow, becoming amber-coloured with maturity, dotted with crimson and russet.

The tree succeeds as a bush, pyramid, or standard, and bears heavy crops. It is a great favourite with market gardeners.

* **Grand Duke.** — An excellent late cooking Plum, ripe in October. Fruit oval, dark, almost blackish-purple, but reddish on the shaded side, the whole surface being covered with a bluish bloom.

The tree is a vigorous and hardy grower, and a heavy cropper. It is suitable for orchards or market gardens, and may be grown as a pyramid, standard, or cordon.

Green Gage.—One of the most popular and highly flavoured Plums, ripe from the middle of August. Fruit medium, roundish, yellowish-green, becoming deeper yellow tinged with green when ripe, dotted with crimson, and coated with a greyish bloom.

The tree is a vigorous, hardy grower, and bears abundantly. The fruits, although not so large as when grown on an espalier or against a wall, are more richly flavoured from standards.

Guthrie's Late Green.—An excellent dessert Plum, ripe about the end of September. Fruit rather large, roundish, greenish-yellow, covered with a thin bloom.

The tree is hardy and a good bearer.

Ickworth Impératrice.—A very fine dessert Plum, ripe in October, but becoming enriched in flavour if not picked until it begins to shrivel. Fruit large, obovoid, purple, streaked with yellow.

The tree forms a fine pyramid and bears well.

Impériale de Milan. —An excellent dessert or cooking Plum, ripe about the beginning of October. Fruit large, oval, dark purple, streaked and dotted with yellow, and covered with a thick bluish bloom.

Jefferson. — A sweet and highly flavoured dessert Plum, of American origin, ripe early in September. Fruit large, oval, greenish-yellow, becoming deeper yellow with maturity, flushed and dotted with red on the sunny side.

The tree grows vigorously and bears abundantly. It is good as a pyramid or cordon.

Kirke's.—One of the finest and most deliciously flavoured of dessert Plums, ripe about the middle of September. Fruit rather large, round, deep purple, with a few yellow dots, and covered with a dense bright blue bloom. The tree is hardy and vigorous and bears well. It is suitable for a standard or cordon.

* **Orleans.**—An excellent cooking and preserving Plum, ripe from the middle of August. Fruit medium, roundish, deep red, becoming purple when fully ripe, and covered with a bluish bloom.

The tree is hardy and vigorous and bears well, especially in light warm and rather sandy soils. The flavour of the fruit is also improved by wall cultivation.

Oullins Golden.—An excellent tender and deliciously flavoured dessert Plum, ripe about the middle of August. Fruit large, bluntly oval, rich yellow, dotted with crimson on the sunny side and covered with a delicate whitish bloom.

The tree makes a fine pyramid, and bears very heavily. It may also be grown as standards, bushes, or cordons.

* **Pond's Seedling.**—A fine cooking Plum, ripe from the beginning to the end of September. Fruit very large, oval, narrowing towards the stalk, fine deep red, dotted with grey, and coated with a delicate bluish bloom.

The tree is a vigorous grower, and makes a good bush, pyramid, or standard.

Prince Englebert. — A fine richly flavoured Plum ripe in September, suitable for cooking purposes, and also for dessert when fully ripe. Fruit very large, oval, deep purple, covered with tiny russety dots, and covered with a greyish bloom.

The tree bears very heavily, especially when grown as a cordon or pyramid.

* **Prince of Wales.**—A good and useful cooking Plum, ripe in the middle of September. Fruit rather large, roundish oval, bright reddish-purple, dotted with yellow, and covered with a dense blue bloom.

The tree is a heavy cropper. In warm places it may be grown as a bush, pyramid, or standard, but against walls in cold districts.

Purple Gage (*Reine Claude Violette*). — An excellent dessert Plum, ripe early in September, and improving its delicious flavour if allowed to hang on the tree late, until it shrivels. Fruit medium, round, light purple, dotted with yellow, and covered with a bluish bloom.

The tree is hardy and bears abundantly, either as a bush, pyramid, or standard, or against a wall as a cordon.

Reine Claude de Bavay.—An exquisitely flavoured Plum ripe at the end of September and beginning of October. Fruit large, roundish, greenish-yellow, mottled and streaked with green, dotted with red on the sunny side, and covered with a faint white bloom.

* **Rivers' Early Prolific.**—A grand and highly flavoured cooking Plum ripe at the end of July and early in August. Fruit

medium, roundish, purple. The tree has a spreading drooping habit, and is a great bearer.

It succeeds best as a half standard.

* **Rivers' Monarch.**—A splendid cooking Plum ripe at the end of September and early October. Fruit large, roundish oval, deep bluish or almost blackish-purple.

The tree is a vigorous grower and a heavy cropper. It succeeds well as a bush, pyramid, standard, or cordon.

Transparent Gage.—A deliciously sweet and juicy dessert Plum, ripe early in September. Fruit large, round, pale, almost translucent, greenish-yellow, dotted and marbled with red.

The tree grows well and bears freely, especially when grown as a cordon.

* **Victoria.**—This is one of the best known and most prolific of cooking Plums, ripe in September. Fruit large, roundish oval, bright red on the sunny side, paler red on the shaded side, and coated with a delicate bloom.

The tree is a medium grower of spreading habit but bears enormous crops of fruit, and for this reason is highly prized by market gardeners and others. It may be grown as a bush, standard, or pyramid.

* **Washington.**—An excellent cooking Plum ripe in September; also suitable for dessert when fully ripe. Fruit large, roundish ovoid, dull yellow, mottled and tinged with green, becoming deep yellow when fully ripe, dotted with crimson, and covered with a pale greyish bloom.

The tree is hardy, vigorous in growth, and a heavy cropper. It succeeds well either as a pyramid or standard, and also against a wall.

* **White Magnum Bonum.**—An excellent cooking or preserving Plum, ripe during September. Fruit very large, oval, thick-skinned, deep amber-yellow, covered with a thin white bloom.

The tree is hardy and vigorous and a good bearer. It succeeds as a standard, pyramid, or bush, but the size and flavour of the fruit are enhanced if grown against a south wall.

Select list of **Dessert Plums** arranged in the order of ripening. Those marked with an asterisk (*) are suitable for small gardens.

August.—* Belgian Purple, Bryanston Gage, Denniston's Superb, * Early Transparent Gage, Green Gage, Oullins Golden.

September. — Brahy's Greengage, * Bryanston Gage, Guthrie's Late Queen, Prince Englebert, * Jefferson, Kirke's, Purple Gage, Transparent Gage, * Coe's Golden Drop.

October.—Blue Impératrice, * Ickworth Impératrice, Impériale de Milan, * Reine Claude de Bavay.

Select list of **Cooking** and **Preserving Plums** arranged in order of ripening. Those marked with an **asterisk** (*) are suitable for small gardens.

August. — * Rivers' Early Prolific, * Czar, Gisborne's, Orleans.

September. — Prince of Wales, * Victoria, * Pond's Seedling, Diamond, Autumn Compôte, * Archduke, White Magnum Bonum, Washington, * Rivers' Monarch, * Cox's Emperor.

October.—Grand Duke.

THE BULLACE (PRUNUS INSITITIA). The Bullace, like the wild Plum, is found wild in parts of Britain in hedges, copses, banks &c. The fruit is larger than the Damson or Sloe, and is usually round in shape, and is less acrid and more agreeable in taste than the fruits of those trees.

From a gardening point of view the Bullace is usually treated as a variety of the Plum, and its cultivation is similar. The fruit is excellent for pies or tarts, and is improved in flavour after being mellowed a little by frost.

The following are the kinds of Bullaces best known:—

Black Bullace.—This is found wild in hedges and woods. It has small round black fruits covered with a thin bloom.

Culture &c. as for Plums, p. 1069.

Essex Bullace.—The round fruits of this are 1 in. or more in diameter, green, becoming yellow when ripe, with a juicy flavour. The tree forms a fine pyramid, and bears very heavily, the fruit being ripe at the end of October and beginning of November.

Culture &c. as for Plums, p. 1069.

Royal Bullace.—The fruits of this variety are about 1¼ in. in diameter, roundish, bright grass-green, mottled with red on the sunny side and becoming yellowish-green when ripe, with a delicate grey bloom. It has a brisk agreeable flavour, and ripens early in October. The tree is a very heavy cropper.

Culture &c. as for Plums, p. 1069.

White Bullace.—The fruit is small, roundish, pale yellowish-white, mottled with red on the sunny side. Ripe at the end of October and beginning of November. A very heavy cropper.

Culture &c. as for Plums, p. 1069.

THE DAMSON (PRUNUS INSITITIA VAR.).—The Damson is really a form of the Bullace, or *vice versâ*, but is distinguished by having oval, and not round, fruits.

Damsons grow in ordinary good soil, preferring moist places such as along the banks of streams &c., and they do not seem to bear abundantly until well advanced in age. They require little or no attention beyond keeping the ground clean, and the fruits, like the Bullaces, are improved by being frosted.

The following kinds of Damsons are grown:—

Bradley's King.—This ripens in September and has an excellent flavour, the fruit being medium in size. The tree is a vigorous grower and free cropper.

Crittenden's or **Farleigh Prolific.**—This is a fine Damson, with roundish oval fruits having a delicate bloom. They are ripe in the middle of September and are borne abundantly. The trees make fine pyramids.

Prune Damson (*Cheshire* or *Shropshire Damson*).—This is a free-growing variety with large leaves and more or less obovoid fruits, ripe in the middle of September.

Other Damsons are **Rivers' Early**, which is ripe in August, and the **White Damson**, which has pale yellow fruits, ripe from the middle of September.

THE CHERRY (PRUNUS AVIUM and P. CERASUS).—The cultivated Cherry is a very ornamental plant and quite as suitable for the lawn as for the fruit garden proper. It is supposed to be derived from the two species mentioned above, particulars of which will be found at pp. 858, 859.

For gardening purposes cultivated Cherries may be grouped into four principal classes, according to the synopsis given by the late Dr. Hogg in his 'Fruit Manual':—

I. GEANS.—These are round-headed trees with long wavy, thin, and flaccid leaves, and more or less heart-shaped fruits with a tender and melting flesh. According to the colour of the flesh they are divided into (i.) *Black Geans* and (ii.) *Red Geans.* They grow best on the Cherry stock as a rule.

II. BIGARREAUS.—These resemble the Geans in habit and foliage, but have heart-shaped fruits, which are divided according to colour into (i.) *Black Hearts* and (ii.) *White* or *Red Hearts.* They grow best on the Cherry stock as a rule.

III. DUKES.—The Duke Cherries have upright or spreading branches, with large and broad leaves. According to colour they are called (i.) *Black Dukes* and (ii.) *Red Dukes.* They grow best on the Mahaleb stock as a rule.

IV. MORELLOS.—These have long, slender, and drooping branches, with small and narrow leaves. According to colour of the fruits they are known as (i.) *Black Morellos* and (ii.) *Red* or *Kentish Morellos.* They grow best on the Mahaleb stock as a rule.

Soil.—Cherries flourish on rather light loamy and calcareous or ferruginous soils. Thorough drainage is essential, as impermeable soils containing stagnant moisture soon cause the trees to turn yellow and become unhealthy, while the otherwise tender fruits acquire an acid and even bitter flavour.

Stocks.—As mentioned above the 'Geans' and 'Bigarreaus' are as a rule best grown on the Cherry stock, while the 'Dukes' and 'Morellos' thrive on the Mahaleb stock, the latter being derived from *Prunus Mahaleb* described at p. 860. Although there may be isolated exceptions to this general rule, it is on the whole safer to keep each group to the stock on which it thrives and fruits best.

The Cherry stock is raised from the seeds (stones) of the wild Geans, Dukes, or Morellos. They may be sown thinly out of doors as soon as ripe in drills about 2 in. deep, transplanting the seedlings at the end of the second year's growth.

The Mahaleb stock is increased from seeds or layers, and is valuable for the dwarfing influence it exerts upon the varieties grafted or budded on it. The idea is gaining ground that gumming is not so frequent on the Mahaleb as on the Cherry stock.

Propagation.—Cherries may be grafted in spring when the sap has begun to flow, or budded about July, in dull showery weather. (See articles on Budding and Grafting, pp. 52–58.)

Training. — Cherries may be grown as bushes or pyramid trees planted not nearer than 10 ft., and as standards with a distance of 20–30 ft. between them. On walls a distance of 15–20 ft. may be left between the plants to allow for extending the branches without having to prune them too severely.

The black and red Morello Cherries may be trained on walls facing north and east, while the others may be grown with more favourable aspects.

The best time to plant Cherry trees is in November, but any time up to the end of February is suitable provided the weather is mild, and the soil not in a wet, sodden, or frosty condition.

Protection. — Besides the protection from spring frosts given by walls, it is also essential to keep a guard over the fruits when they are ripening, as the birds play great havoc among them. The only sure plan to save them is by covering the trees with a net, the meshes of which will prevent the entrance or exit of the birds. With the exception of the Morello Cherries, which are improved by hanging on the tree as long as possible after ripening, all others should be eaten when ripe.

Thinning the Fruit. — Some Cherries produce immense numbers of flowers, but it is undesirable that they should all set their fruit. The strain upon the tree would be too great. Where a very heavy crop is left after the 'stoning' period, it is wise to go over the trees and thin out the smallest and least likely fruits. This may be done on dwarf and wall trees fairly easily, but becomes almost impossible on tall standards grown in orchards or market gardens. In most localities, however, it is scarcely necessary to do any thinning, as only a fair percentage of the fruits will come to perfection, the others dropping naturally at the stoning period. To assist the setting and ripening of the fruits a good mulching of well-rotted manure may be placed on the soil, and this practice will be found beneficial to all fruits of this period.

Insect Pests, Diseases &c.—Gumming is perhaps one of the worst afflictions of the Cherry tree, as with the Plum tree. It is often due to badly drained soil and bad pruning, that is, if there can be any other kind of pruning except that which is done properly. Pinching or cracking the growths in summer and judicious cutting back in autumn are great preventives (see p. 1034).

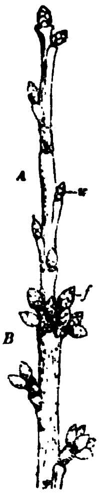

FIG. 156.—CHERRY.

Canker occasionally attacks the trees and may be remedied as described under the Apple, p. 1047.

The *Black* or *Bean Fly* (*Aphis rumicis*) is sometimes a great nuisance. It may be checked by spraying with a solution of soft soap, quassia chips, and tobacco as in the case of Plums (p. 1071).

Pruning. — Summer and autumn or early winter pruning are very beneficial to Cherries when practicable. In the case of large standards, however, it will be sufficient to thin out unnecessary branches. On the whole Cherries require less pruning than Apples, Pears, or Plums, and it is very rarely advisable to root prune them (see p. 1081). Morello Cherries require a different system of pruning, as stated below.

The difference in the wood and fruit buds is shown in the illustration, fig. 156. At A is represented last year's growth bearing only wood-buds shown at *w*, while at B are shown the short spurs with plump fruit-buds.

VARIETIES OF CHERRY TO GROW

In the following descriptions the names are arranged alphabetically, but as a certain amount of importance is attached to the various sections into which the Cherries are divided (see p. 1075), these have been distinguished as follows. The letter 'G' in brackets following a name indicates that the variety belongs to the Gean section; the letter 'B' the Bigarreau section; the letter 'D' the Duke section; and the letter 'M' the Morello section.

Dr. Hogg in his 'Fruit Manual' describes over 120 varieties of Cherries, but the following will be found to comprise the finest and those most worth growing.

Archduke (D).—A rich and briskly flavoured Cherry ripe from the middle of July, pale red at first, becoming deep red.

and ultimately almost black when allowed to hang until fully ripe.

The tree bears well and succeeds against a north wall.

Bigarreau (B).—This is one of the oldest and best Cherries, ripe from the middle of July, with a rich, sweet and excellent flavour. The fruit is very large, pale yellow or amber, marbled with red, dotted with crimson in the shade.

The tree is very hardy and vigorous and bears heavily when young. It is well suited for orchards and market gardens.

Bigarreau Napoleon (B).—A sweet and deliciously flavoured Cherry, ripe at the end of July and early in August. Fruit very large, pale yellow dotted with red, becoming flushed with red on the sunny side when ripe.

The tree grows vigorously and is not subject to gumming. It bears abundantly and makes a fine standard, but may also be grown against a wall.

Bigarreau Noir de Schmidt (B). — A beautiful deep shining black-fruited Cherry, ripe in July, having a sweet rich flavour. It makes a good bush or pyramid.

Black Eagle (G).—An excellent and highly flavoured Cherry, ripe early in July. Fruit large, roundish flattened, 2–3 in a cluster, very dark purple, almost black when fully ripe.

The tree is hardy and vigorous in growth and bears heavily. Bush, pyramid, or on a wall, but excellent as a standard.

Black Tartarian (B). — A handsome and exquisitely flavoured Cherry, ripe at the end of June and beginning of July. Fruit very large, bluntly heart-shaped, deep blackish-brown, becoming quite black when fully ripe.

The tree grows vigorously, at first with an upright habit, but somewhat drooping when old. It bears well, and produces the best fruits when grown on a wall. By growing the trees on a north wall the fruits will hang until about the second week in August.

Duchesse de Palluau (D). — A fine Cherry, ripe at the end of July, having a juicy, brisk, and acidulous flavour. Fruit large, flattish, bright red, becoming deeper red when fully ripe.

The tree is hardy and vigorous and may be grown as a bush or pyramid.

Early or Bigarreau Jaboulay (G). — A rich and deliciously flavoured Gean (not Bigarreau) Cherry, ripe at the end of June. Fruit large, bluntly heart-shaped, deep amber-yellow, blotched and dotted with bright red.

This succeeds best on a wall.

Early Purple Gean (G).—A deliciously flavoured Cherry, ripe at the end of May and beginning of June. Fruit large, shining dark, almost blackish, purple, with a tender juicy flesh.

The tree is a strong grower, and bears well. It succeeds as a standard, but unlike most of the Gean Cherries prefers the Mahaleb to the Cherry stock. When grown against a wall, the fruits ripen earlier than when grown as a standard, and this makes it one of the very earliest Cherries grown.

Early Rivers (G).—A sweet and excellent small-stoned Cherry, ripe at the end of June. Fruits large, roundish heart-shaped, 10–12 in a cluster, deep shining black.

The tree has a free drooping habit and succeeds well as a standard.

Elton (B). — A delicious Red Heart Cherry, ripe early in July. Fruit large, pale waxen yellow mottled and dotted with bright red on the sunny side.

The tree is a fairly vigorous grower and bears abundantly, especially as a standard, although it also succeeds against a wall.

Empress Eugenie (D).—A fine form of *May Duke*, and ripening before that variety at the end of June. Fruit large, bright red, changing to deep purple-red when fully ripe.

The tree is a strong and upright grower, suitable for standards, pyramids, or bushes.

Governor Wood (B). — An excellent sweet and richly flavoured Red Heart Cherry, ripe early in July. Fruit large, pale yellow, flushed and mottled with red on the sunny side. This variety succeeds well grown as a standard.

*** Kentish (M).**—An excellent cooking Cherry of the Red Morello section, ripe from the middle of July, and having a very rich and juicy flavour. Fruit medium, pale flesh coloured, changing to deep bright red, and becoming very dark almost blackish if allowed to hang until dead ripe.

The tree is a strong grower and succeeds as a bush or standard. The fruit is excellent for tarts, preserving &c.

Late Bigarreau (B). — A handsome sweetly flavoured Cherry, ripe about the middle of August. Fruit large and uneven in outline, beautiful rich yellow, flushed with bright red on the sunny side.

The tree is a vigorous grower and succeeds as a bush, pyramid, or standard.

Late Duke (D).—A valuable richly flavoured Cherry, ripe from the middle of August. Fruit large, bright shining red, becoming deeper in colour with ripeness.

Succeeds as a standard, pyramid, bush, or against a wall.

May Duke (D).—This is one of the finest of the Duke Cherries, being tender and juicy in flavour, and ripe early in July. Fruit large, bright red at first, becoming deep rich red when ripe.

The tree is a free grower with an upright habit, and succeeds as a standard, bush, or pyramid.

* **Morello (M).**—An excellent cooking or preserving Cherry, ripe in July and August, but improving by hanging late on the tree into September. Fruit large, deep red, becoming deeper in colour, almost black if allowed to hang late.

The tree is a slender graceful grower with a spreading habit and drooping shoots. It bears well as a standard, but may also be trained against a north wall, where the fruits attain a greater size and ripen later.

The 'Wye' Morello, which has smaller fruits, but equally rich in flavour, succeeds well as a standard or half-standard.

Morello Cherries require somewhat different treatment from other Cherries in regard to pruning. The methods employed for the Peach and Nectarine (p. 1080) will suit them well. As long as the shoots are thinned out a little where required in autumn, leaving the remaining ones plenty of room to develop, Morello Cherries require little attention in this respect.

Royal Duke (D).—A handsome and deliciously flavoured Cherry, ripe about the middle of July. Fruit large, flattish, deep and clear shining red, never becoming black with over ripeness

The tree is a strong and upright grower and bears abundantly. It succeeds as a standard and also forms a fine compact pyramid.

Waterloo (G).—An excellent and highly flavoured Cherry, ripe at the end of June and beginning of July. Fruit large, dark purple and brownish-red, covered with paler dots, and becoming almost black when fully ripe.

The tree grows freely and bears well. It succeeds best as a standard, but may also be grown against a wall.

Werder's Early Black (G).—A valuable rich and highly flavoured Cherry, usually ripe enough for use about the middle of June. Fruit very large, deep shining black, with a deep suture on one side.

The tree grows vigorously and bears heavy crops with great regularity. It flourishes as a standard.

List of **Dessert Cherries** in order of ripening. Those marked with an asterisk (*) are suitable for small gardens.

June.—Early Purple Gean, * Early Jaboulay, * Early Rivers, * Werder's Early Black, Empress Eugenie.

July.—Black Tartarian, * Black Eagle, Waterloo, Governor Wood, Archduke, * May Duke, * Elton, Royal Duke, Duchess de Palluau, Biggarreau.

August.—Late Duke, * Bigarreau Napoleon, Late Bigarreau.

CHERRIES *for cooking and preserving*

* Kentish, * Morello.

THE PEACH and NECTARINE (PRUNUS PERSICA).—The Peach and Nectarine are not only forms of the same species (*Prunus Persica*, which has been described at p. 862), but they are also so similar in tastes that what suits one is as a rule also agreeable to the other. When in fruit they are readily distinguished from each other—the fruit of the Peach being covered with a more or less woolly down, while that of the Nectarine is quite smooth. But in winter, when the branches are leafless, it is practically impossible to distinguish one from the other.

An examination of the foliage shows that the leaves of some varieties have serrate edges, while others are crenate and have either roundish or kidney-shaped glands on the leaf stalk, or none at all. As a rule the varieties with serrate leaves are destitute of glands, and curiously enough are considered to be more subject to attacks of mildew than the crenate-leaved varieties which are usually furnished with glands. It is just possible that these glands may serve some useful purpose in warding off attacks of mildew, or they may perform some service analogous to the bacteria nodules on the roots of Leguminous Plants (see pp. 70, 822). Sometimes there is one gland at each side of the leaf stalk, sometimes two, and very rarely three.

The flowers of the Peach and Nectarine vary in colour from pure white to rosy-pink and bright crimson. Some varieties have very small blossoms, while those of others are comparatively large. The petals of the latter show the effects of spring frosts more clearly than those of the smaller flowers; hence many imagine that the smaller-flowered varieties are the hardier, but there is no evidence to support this theory. The fruits are classed as 'clingstones' or 'freestones' according as to whether the rich juicy flesh clings tightly to the stone in the centre or parts from it readily.

Soil.—Although Peaches and Nectarines grow well in ordinary good and well-drained garden soil, far better results are obtained when the trees are planted in a rich turfy loam, quite free from strong manure, and having a perfectly drained subsoil. As a rule the soil in which Plums flourish is also suitable for Peaches and Nectarines. An excellent addition to the soil for Peaches, Nectarines, and Apricots is a fair quantity of old mortar rubbish. Bone-meal is also a splendid food for these plants, and to secure a good compost the soil may be made up as follows: 3 parts of good loam to 1 part of old mortar rubbish, with a good sprinkling of bone-meal and half-inch bones over the whole. This should be thoroughly mixed and will give good results.

Situation.—Being originally a native of a warmer, sunnier, and less variable climate than our own, Peaches and Nectarines require to be grown in the warmest and best and most sheltered positions in the gardens of the British Islands. Cold bleak situations are quite unsuitable, and it is impossible to produce good fruits or trees in such localities. As a rule a south or south-west wall is the best position for growing Peaches and Nectarines, and it little matters whether the plants are trained on special walls, or up the sides of houses or buildings, so long as the aspect and soil are favourable. In the mildest parts of the south and west excellent Peaches of early and midseason varieties are produced on west and east walls.

Borders.—These are often prepared in a sloping position facing south with the object of obtaining as much heat from the sun as possible. But in the colder parts of the country it may be questioned whether this is altogether a wise proceeding. The extra warmth stimulates the roots to earlier action with the consequence of earlier blossoming. This would be a great advantage were it not for the spring frosts which often come just as the plants are setting their fruits, and spoil the majority of them. If the roots had not been stimulated into early growth, the buds would not have opened so early, and would probably have escaped the effects of the frosts. (See the article on Fruit borders, p. 1038.)

Protectors. — Where, however, the walls are protected by a slightly overhanging coping, or some of the light frame glass protectors fixed on brackets at the top of the wall, which are now coming into favour, or when care is taken to protect the flowers by thin canvas, it is rather an advantage to have early blossoms, but the disadvantages—chiefly in regard to water—of inclined borders should not be overlooked. They are referred to at p. 1038.

Propagation. — Peaches and Nectarines are usually increased by budding on stocks of the seedling Peach or Nectarine, the Almond (*Prunus Amygdalus*, p. 357), and various forms of the Plum, such as the Mussel, St. Julian, Black Damask, and White Pear. Plum stocks are used as a rule. There is no reason, however, why some of the better class cultivated Plums should not be used as stocks, and it is possible that selections of early and late varieties for this purpose would in the course of time have a beneficial effect upon the Peach and Nectarine. The dormant buds used are inserted either in July and August in dull showery weather, or earlier in April and May with a sprouting bud. Grafting may also be practised in spring just as the sap begins to rise, with well-ripened short-jointed scions, having a small portion of

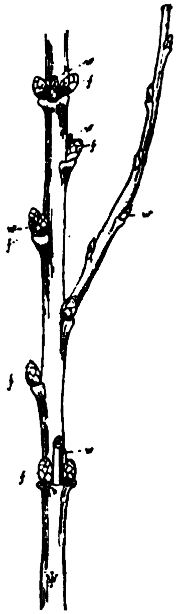

FIG. 157.—PEACH.

the two-year-old wood attached. (See Budding, p. 58, and Grafting, p. 52.)

Planting &c.—The best time to plant Peach and Nectarine trees is in November or else about February or March in mild open weather when the soil is in a good friable condition (see p. 1032). The surface of the soil may be covered with a layer of light litter, but rich manure is not advisable at this period for Peaches and Nectarines. When, however, the trees are well set with fruit, a good mulching of well-rotted manure will assist in the swelling of the fruits, and during the season occasional waterings with liquid manure will also be highly beneficial. From the end of May or when the fruit has set onwards, frequent syringings on warm bright days will improve the condition of the trees, keeping the foliage not only clean and bright, but also free from dirt, dust, insects &c.

There is little to be said in regard to training Peaches and Nectarines out of doors, as the trees are mostly grown fan-shaped on walls. Only in the very mildest parts of the British Islands is it worth while attempting to grow them as standards, half standards, or bushes.

Pruning.—As the fruits of Peaches and Nectarines are borne on the wood of the previous year, it is essential to bear this fact in mind when pruning the plants. In summer any gross side shoots may be cut right out, except where wanted to fill a gap and give the tree a symmetrical appearance. In this case only such shoots may be pinched back or broken to about 4 eyes, as recommended under summer pruning. In autumn, when the foliage has fallen, little remains to be done beyond cutting out any useless twigs.

The difference between the twigs producing the flower-buds and the old wood is shown in the illustration (fig. 157). It will be noticed that there are usually 2 plump fruit-buds, one on each side of the more slender wood-bud in the middle. This wood-bud shoots and makes a leafy branch which in due course also bears leaf and flower buds in the same way.

Disbudding.—This operation is practised in spring, when the buds start into growth. It consists in removing at intervals all the wood-buds that are not required. As a rule all wood-buds except one at the base and one at the apex of the shoot are removed, thus saving the sap for those that are left, so that they may have increased vigour.

Thinning the Fruit.—This is nearly always necessary where trees are in good bearing, as there are usually far more fruits set than can be borne with safety to the tree. When the fruits are well set the trees should be examined, and all fruits pointing towards the wall or otherwise unfavourably placed should be rubbed with the finger. When finished the remaining fruits should be about 6 in. apart, and when these have 'stoned,' as gardeners say, every alternate one may be removed—that is, if the finest flavoured, largest, and best are ultimately wanted, and if it is desired not to put too great a strain upon the tree. It must be remembered that during the flowering and fruiting period of any plant or tree the reserve material and elaborated sap manufactured by the leaves are being heavily drawn upon, and it is unwise to allow the process to go too far.

Root-pruning. — This is rarely necessary for Peaches or Nectarines. When required it is best done in autumn and as advised at p. 1081.

Diseases &c. — Peaches and Nectarines are sometimes troubled with attacks of mildew (*Sphærotheca pannosa*) which forms greyish-green patches on the leaves. A scarcity of moisture at the roots, or an erratic season with sudden changes from hot to cold, will often develop favourable conditions for this disease. It may be checked by dusting with flowers of sulphur, either in a dry powdered state or mixed with water and sprayed on with a syringe, but fruits once attacked are irreparably injured, although not altogether valueless.

Leaf-curl or *Peach-blister* is another disease often readily noticed by the blistering and curling of the leaves, a state of affairs probably brought about by bad drainage, cold and inclement weather &c. The best remedy is to detach the injured leaves and branches and burn them immediately, as the malformation is brought about by a fungus called *Exoascus deformans.*

Gumming is very often a serious disease with Peaches and Nectarines, and when allowed to go too far there is no remedy except uprooting the trees and burning them. Gumming is sometimes caused by the caterpillars of the Apple or

Pear tree bark Moth (*Semasia woberiana*) which burrows under the bark, penetrating the wood for a short distance. When caused by bad soil or drainage, gumming may be checked by opening a trench all round the roots, seeing to the drainage, and adding good fresh turfy loam. In other cases, a plaster of clay mixed with paraffin has been recommended as a remedy or preventive.

Aphides are sometimes very troublesome, but may be kept in check by spraying with a solution of soft soap, quassia, and tobacco, as recommended for Plums (p. 1071). Various beetles and caterpillars sometimes attack the flowers, fruit, or leaves, but do little damage. Spraying with Paris green before the buds open (see p. 1047) is useful. In the case of the Peach scale insect (*Lecanium persicæ*) which attacks the foliage, they must be removed with a stiff brush and a solution of soft soap, quassia, and a little paraffin.

PEACHES

Alexander. — A delicious American Peach ripe about the middle of July. Fruit medium, roundish, yellow, stained with crimson and washed with bright red or scarlet, with deeper coloured streaks and patches on the sunny side.

The only fault to be found with this fine variety is that it is a 'clingstone.' Also good for pot culture (see p. 1040).

Alexandra (*Alexandra noblesse*). — A splendid richly flavoured roundish Peach of the largest size, pale in colour, with a few clusters of red dots on the sunny side. The fruit is ripe in the middle of August, and the leaves are furnished with round glands.

The tree is vigorous in growth, and not subject to mildew, also good for pot culture (see p. 1040).

Amsden June.—A fine American Peach with a rich and juicy flavour, ripe in the middle of July. Fruit medium, roundish, greenish-white, tinged with bright red on the sunny side. Leaves with kidney-shaped glands. Flowers large, pale.

Barrington. — An excellent large flowered Peach, with roundish ovoid fruits, ripe in the middle of September, with a rich vinous flavour; yellowish-green in colour. The tree is hardy and free-growing and usually bears well. Also good for pot culture (see p. 1040).

Bellegarde.—A rich, vinous, and juicy Peach of the finest quality, ripe about the middle of September. Fruit roundish, deep red, striped with dark purple. Leaves with round glands.

The tree is a heavy cropper, and bears small flowers.

Crimson Galande.—A very fine Peach, ripe about the middle and end of August, and having a rich and delicious flavour. Fruit large, roundish, uneven in outline, very deep, almost blackish-crimson, except on the shaded side, which is pale yellow. Leaves with round glands. The tree is a hardy and vigorous grower and bears abundantly. Also good for pot culture (see p. 1040).

Dagmar. — A handsome and richly flavoured Peach, ripe early in August. Fruit large, pale straw-yellow, densely covered with tiny crimson dots. Glands kidney-shaped, but sometimes round on the small leaves.

The tree is hardy and vigorous, and the small flowers set freely and produce heavy crops.

Dr. Hogg. — A valuable and richly flavoured Peach, ripe early in August. Fruit medium, roundish, lemon-yellow, dotted with crimson, and flushed with crimson on the sunny side. Flowers large. Glands kidney-shaped.

The tree is a strong grower and a heavy cropper, and is suitable for market as well as private gardening. Also good for pot culture (see p. 1040).

Dymond. — An exceedingly fine and deliciously flavoured Peach, ripe about the middle of September. Fruit large, roundish, flattened, greenish-yellow, suffused with red, and mottled with brighter red on the sunny side. Flowers large. Glands none.

The tree is so hardy and prolific that this variety should be in all gardens.

Gladstone.—A fine juicy and richly flavoured Peach, ripe at the end of September. Fruit very large, roundish and flattened, whitish-yellow, mottled with red on the sunny side. Flowers large. Glands none.

Free growing and valuable on account of its lateness.

Golden Eagle. — A beautiful richly flavoured Peach, ripe at the end of September and beginning of October. Fruit very large, round, deep orange-yellow, flushed with red on the sunny side, and tinged with green in the shade. Flowers small. Glands kidney-shaped.

Grosse Mignonne.—This delicately flavoured Peach ripens about the end of August and beginning of September. Fruit large, roundish, slightly flattened, pale greenish-yellow, mottled with red, flushed with brownish-red next the sun. Flowers large. Glands round.

In some localities this variety is rather delicate and subject to mildew, but in others it is healthy and quite free from mildew attacks.

Hale's Early.—A fine and deliciously flavoured Peach, ripe early in August. Fruit medium, round, crimson coloured with darker crimson streaks, and deep red on the sunny side. Flowers large. Glands round.

This is still one of the best early Peaches grown. Also good for pot culture (see p. 1040).

Lady Palmerston.—A handsome late Peach, ripe at the end of September and beginning of October. Fruit large, greenish-yellow, marked with crimson. Flowers small. Glands kidney-shaped.

Late Admirable.—A fine Peach, ripe at the middle and end of September. Fruit very large, yellowish-green, marbled and striped with pale and deep red, especially on the sunny side. Flowers small. Glands round.

Also good for pot culture (see p. 1040).

Salwey.—A good Peach ripe at the end of October and beginning of November. Fruit medium, round, deep rich yellow. Flowers small. Glands kidney-shaped.

Sea Eagle.—A handsome, highly flavoured Peach, ripe at the end of September. Fruit very large, round, pale lemon-yellow, flushed with deep red on the sunny side. Flowers large. Glands round.

This is one of the best late Peaches for the open air. Also good for pot culture (see p. 1040).

Walburton Admirable.—An excellent late Peach, ripe from the end of September. Fruit large, round, pale yellowish-green, flushed and mottled with crimson on the sunny side. Flowers small. Glands round.

The tree is hardy and vigorous, and usually a good bearer, except in unfavourable seasons.

Waterloo.—A very fine richly flavoured American Peach, ripe about the middle of July. Fruit rather large, roundish, pale greenish-yellow flushed and mottled with bright red on the side next the sun.

Also good for pot culture (see p. 1040).

List of **Peaches arranged** in the order of ripening. Those with an asterisk (*) are suitable for small **gardens.**

Ripe in July.—* Alexander, Amsden June, Waterloo.

Ripe in August

* Hale's Early.
Dagmar.
* Dr. Hogg.
* Alexandra.
* Crimson Galande.
* Grosse Mignonne.

Ripe in September

* Bellegarde.
* Dymond.
Barrington.
Late Admirable.
Gladstone.
* Walburton Admirable.
Sea Eagle.
Golden Eagle.
Lady Palmerston.

Ripe in October

Salwey.

Royal George and *Noblesse*, both fine Peaches, ripe at the end of August, have been omitted from the list as they are very much subject to mildew; and *Lord Palmerston*, although a fine-looking Peach, is as a rule quite useless except for cooking purposes.

NECTARINES

Darwin.—A rich-flavoured handsome Orange Nectarine, ripe early in August. The fruits are large, and borne in great abundance.

Dryden.—Fruit large, dark red on the sunny side, pale green in the shade, flesh white, very sweet, juicy, and of excellent flavour, one of the very best Nectarines.

Early Rivers.—A deliciously flavoured Nectarine, ripe about the middle of July, or about 3 weeks before *Lord Napier*, hitherto the earliest Nectarine known. The fruit is large, and brilliant bronzy-red in colour.

The tree is hardy and vigorous, and bears abundantly.

Goldoni.—A rich and juicy Nectarine, ripe early in August. Fruit medium, bright orange-yellow, streaked and spotted with crimson on the side exposed to the sun.

The tree is hardy and vigorous, and bears well. Also good for pot culture (see p. 1040).

Humboldt.—A delicious Orange Nectarine, ripe in early September. Fruit large, bright orange-yellow, stained and streaked with deep crimson, especially on the sunny side.

The tree is strong and hardy, and bears heavily.

Lord Napier.—An excellent highly flavoured Nectarine, ripe early in August, and succeeding *Early Rivers.* Fruit large, ovoid, pale cream or greenish-yellow, mottled, streaked, and washed with blood-red or crimson on the sunny side. Flowers large. Glands kidney-shaped.

This is a strong grower, and bears well. Suitable for pot culture (p. 1040).

Pine Apple.—A yellow-fleshed and highly luscious Nectarine, ripe early in September. Fruit large, nearly oval. pointed, deep orange and crimson.

The tree is vigorous, and bears heavily. Also good for pot culture (see p. 1040).

Victoria.—A highly flavoured Nectarine, ripe at the end of September. Fruit very roundish oval, flattened on top, greenish-yellow, flushed with crimson on the sunny side.

The tree requires a warm soil and a sheltered situation to bring its fruits to perfection in the open air. Good for pot culture (see p. 1040).

Violette Hâtive.—This ripens at the end of August, and has a rich and delicious flavour. Fruit medium, roundish-ovoid, yellowish-green, deep purple-red, mottled with brown on the sunny side. Also good for pot culture (see p. 1040).

List of **Nectarines** in the order of ripening.

Ripe in July.—Early Rivers.

Ripe in August

Lord Napier.
Darwin.
Goldoni.
Violette Hâtive.
Dryden.

Ripe in September

Humboldt.
Pine Apple.
Victoria.

THE APRICOT (PRUNUS ARMENIACA). The WILD APRICOT (see p. 358) is a native of N. China, Japan, and other parts of temperate Asia, but appears to have been cultivated for centuries in Armenia and Syria. In the British Islands it forms a very ornamental flowering tree, being in bloom about February and March, long before other fruit trees. This early flowering is not an advantage in our climate, as the blossoms and consequently the fruits are likely to be irreparably injured by the frosts and fogs prevailing at that period. It is therefore almost essential in most parts of the kingdom to have the flowers protected as recommended for Peaches and Nectarines, by wall copings, light canvas, or better still, glass protectors fitted on brackets on the top of the walls. By this means not only will the blossoms be protected from frost, but also kept dry, and the pollen may be distributed more easily for fertilising purposes. Except perhaps in the warmest and most sheltered parts of Devonshire and Cornwall, and the South of Ireland, the Apricot is best grown on south or south-west walls in the same way as the Peach and Nectarine, as there is little likelihood of obtaining fruit in the open air otherwise.

Soil.—Apricots will flourish in the same soil as Peaches, Nectarines, Plums, and Cherries, but it may as a rule be of a more chalky and sandy nature. It should be deeply cultivated, a depth of 3–4 ft. being none too much to produce the best results. The drainage must be perfect in every way, and where any doubt exists in regard to it, the borders in which the trees are grown should be filled in about 4 ft. below the surface with brickbats, old mortar rubble, clinkers &c., over which may be placed a good layer of turfy loam or the top spit from a pasture, grass downwards. Cold heavy clayey soils should be avoided, as they induce 'gumming' and sterility, whatever fruits are produced often withering and falling before maturity.

Propagation.—Apricots are usually increased by budding (p. 58) in June or July, the stocks mostly used being varieties of the Plum as used for the Peach and Nectarine, and seedling Apricots raised from the 'stones' sown in August or September, in the same way as Cherry seeds (see p. 1075). Grafting (see p. 52) may also be practised, but has not proved to be so successful as budding. Apricots may also be raised and fruited from seeds sown as stated above, but this is only practised for obtaining new varieties.

In regard to disbudding, instead of rubbing out the wood-buds as recommended for Peaches and Nectarines (p. 1080) the shoots may be pinched back to two or three leaves. This induces them to develop fruit spurs later on.

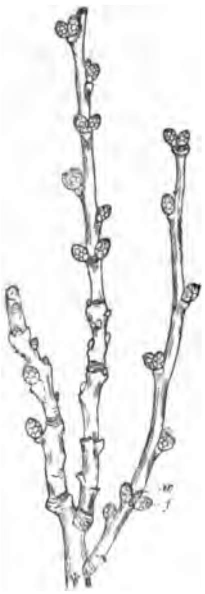
FIG. 158.—APRICOT.

The illustration (fig. 158) shows twigs with fruit-buds and leaf-buds, which may be compared with that of the Peach and Nectarine (fig. 157, p. 1079). It will be noticed that there is a plump fruit (or flower) bud (*f*) at each side of the thin wood-bud (*w*).

In regard to planting, syringing, pruning, thinning the fruit &c., the methods are practically the same as for Peaches and Nectarines, and the reader is advised to consult pp. 1079, 1080 for this information. It may, however, be added that after planting the soil should be very firmly packed round the base of the stem and over the roots, as they particularly like a very solid soil.

Varieties of Apricots

These are comparatively few. Those described below will give the best general results for open-air cultivation in the British Islands.

Breda.—A good Apricot, perhaps not so highly flavoured as others, but vinous and agreeable. Fruit small, roundish, flattened at the sides, deep orange-yellow, flushed with red, and dotted with brown and red on the sunny side.

The tree is a good grower and cropper, and ripens its fruit on walls about the middle of August. It is the only variety that can be grown with any degree of success as a standard in the favoured parts of the south, but the fruits are then a couple of weeks later in ripening.

Hemskerk.—A rich and juicy Apricot, ripe at the end of July. Fruit rather large, roundish, yellow, flushed with red on the sunny side. The tree is hardy, and bears abundantly. It may be grown in preference to the well-known *Moorpark* (of which it is a variety), as this often gives a good deal of dissatisfaction on account of its gumming properties and unequal ripening.

Kaisha.—An excellent and richly flavoured Apricot, ripe in the middle of August. Fruit medium, roundish, pale lemon-yellow, washed and mottled with red on the sunny side. Suitable for preserving. The tree is hardy and a great bearer.

Musch Musch.—A sweet and deliciously flavoured Apricot, ripe at the end of July. Fruit small, roundish, deep and pale orange-yellow, flushed with red on the sunny side. Suitable for preserving. The tree grows freely, but requires particularly warm and sheltered situations to come to perfection.

New Large Early.—A highly flavoured Apricot ripe early in July. Fruit rather large, oval, whitish, sometimes dotted and faintly flushed with red on the sunny side. This variety is valuable on account of its earliness.

Oullins' Early Peach.—A deliciously flavoured Apricot, ripe at the end of July. Fruit large, yellow, flushed with red on the sunny side.

The tree is a good grower and a heavy cropper.

Peach (or **Gros Pêche**).—This is one of the best and most deliciously flavoured Apricots, ripe at the end of August. Fruit large, oval, flattened, pale yellow, faintly flushed with red on the sunny side.

The tree is vigorous and a very heavy cropper.

Powell's Late.—A handsome rich and juicy Apricot, ripe from the middle of September. Fruit large, highly coloured, especially on the sunny side.

This is a very hardy variety, and probably the latest Apricot grown.

Royal.—A first-class Apricot, ripe early in August. Fruit large, oval, slightly flattened, dull yellow, flushed with red on the sunny side.

The tree is a heavy cropper.

St. Ambroise.—A fine, juicy, and agreeably flavoured Apricot, ripe in the middle of August. Fruit large and somewhat pointed, deep yellow, washed with red next the sun.

This and *Peach* are probably two of the most prolific Apricots grown.

Shipley's (or **Blenheim**). — A good Apricot, ripe at the end of July. Fruit large, oval, deep yellow, fairly rich and juicy, and excellent for preserving.

The tree bears abundantly.

The above **Apricots** arranged in order of ripening.

Ripe in July

New Large Early.
Hemskerk.
Musch Musch.

Ripe in August

Oullins' Early Peach.
Royal.
Kaisha.
St. Ambroise.
Shipley's.
Peach.
Breda.
Powell's Late.

THE MEDLAR (MESPILUS GERMANICA).—The ornamental character of the Medlar (see p. 406) is probably its chief claim to cultivation, as from a fruit point of view it is scarcely valued to any extent in the British Islands. It flourishes in ordinary good garden soil, but prefers a rather moist rich loam, which, however, must be well drained, and is occasionally increased by grafting or budding on stocks of the Quince, Pear, Whitethorn, or upon those of the seedling Medlar. The Pear stock, however, is generally preferred, and seedling Medlars have very little if any advantage over them, especially as the seed takes about two years to germinate. The trees when established require little or no attention in the way of pruning or thinning out, and they bear enormous masses of bloom and plenty of fruit every year in favourable situations.

The varieties best known are the *Dutch* or *Broad-leaved Dutch*, which has the largest fruits, but not so highly flavoured as those of the *Nottingham*. The fruit of the latter is much smaller, however, rarely exceeding 1½ in. in diameter, while that of the *Dutch Medlar* is frequently 2½ in. through. The *Stoneless Medlar* is smaller still than the *Nottingham*, and receives its name owing to the absence of seeds. The *Royal Medlar* is a good variety with medium-sized fruit.

Medlar fruits should be allowed to hang on the tree until they have been slightly frosted a few times. They may then be gathered and stored in a cool dry place, as on the shelves of a fruit room (p. 1039), until they become soft and begin to show signs of decay. They should then be eaten or made into a preserve, but are scarcely worth keeping longer, as they fall a prey to a decomposing fungus.

THE QUINCE (CYDONIA VULGARIS). As a fruit tree the Quince is very rarely seen in gardens, although it is extensively grown to supply stocks for grafting Pears. It flourishes in a light soil and prefers rather damp situations. It may be increased by seeds, cuttings, layers, budding, and grafting, and is probably better on its own roots than when grafted or budded on the Pear or Whitethorn stock.

The fruit should be allowed to hang late on the tree, up to November. It should be picked carefully, as it bruises easily and will not last more than a month or six weeks. It is chiefly useful for making jam &c. and for flavouring Apple pies.

Among the varieties of Quince known are the *Apple-shaped*, which is large and roundish like an Apple, and of a beautiful golden-yellow colour when ripe. It is excellent stewed. The *Pear-shaped* Quince is probably best known, being an ornamental tree. The fruit is shaped like a Pear, yellow in colour, and rather woolly and not so highly flavoured as the Apple-shaped variety.

What is known as the *Portugal Quince* is superior to the others, being much milder in flavour and more suitable for stewing, jams, marmalade &c., and becoming red when cooked. Although the tree grows vigorously, it does not, however, fruit freely.

THE RASPBERRY (RUBUS IDÆUS). The botanical characteristics and affinities of the Raspberry will be found at p. 371. As a garden fruit the Raspberry is one of the most easily grown, while it is of the greatest value for cooking, dessert, or preserving purposes. What is commonly known as the fruit of the Raspberry really consists of a number of fleshy little drupes, like so many small Cherries or Plums clustered together. Each little drupe contains a seed. The Common Blackberry or Bramble resembles the Raspberry very much in structure, and is indeed another species of the genus Rubus (see p. 371). The word berry is used in the loose popular sense in the same way as applied to Strawberry (see p. 1088), and not in the sense intended by botanists.

The stems or 'canes' of the Raspberry live only two years, attaining a height of 5–7 ft. when full grown. The first year they shoot up from the creeping rootstock, but bear neither flowers nor fruit. As a rule each compound leaf on the first year's canes is divided into 5 leaflets, but the second year, when they bear flowers and fruits, each leaf consists of only 3 leaflets—as if the food required for the extra two leaflets the first year were utilised for the production of fruit the second year instead.

Soil. — Raspberries will grow in ordinary good garden soil, but prefer one somewhat similar to but rather lighter than that recommended for Strawberries (p. 1089). An open sunny situation, sheltered from bleak cold winds, suits them best, but they also grow well in partial shade during parts of the day, between rows of fruit trees, if not too close together.

Planting. — The best time to plant Raspberries is at the end of October and during November, but not later if the best results are required. A distance of 4–5 ft. each way should separate the plants or 'stools,' but they are often placed much nearer in rows, and without any apparent ill effects if the canes are properly thinned out every year. After planting it is always advisable to place a mulch of short litter or dead leaves around the plants, not only as a protection against the winter, but also as a fertilising agent for the soil.

Pruning. — This is a very simple matter with Raspberries. It simply consists in cutting down to the ground in early summer the canes which have borne fruit; thinning out the young or current year's canes so as to leave about 4 or 6 to each clump; and in late autumn or early spring cutting the tops of these, leaving the fruiting canes 3 to 4 ft. long. This is the treatment given to established plants. In the case of newly planted canes, it is better as a rule to defer pruning until early spring. The canes may then be cut down to within three or four inches of the ground. This will induce the development of strong but non-fruiting canes during the season. Those not required for producing fruit the following season may be cut out, as advised above, and in autumn those left are cut back as with established plants.

Propagation.—The most usual method of increasing Raspberries is by means of the suckers which shoot up in abundance from the creeping roots beneath the surface of the soil—sometimes close to the main clump, sometimes at a distance from it, according to the nature of the variety grown. The suckers are detached by means of a sharp spade, or a 'suckering' iron, and are planted out as advised above. Raspberries may also be raised from seeds, much in the same way as Strawberries, but as the great majority of the seedlings usually bear inferior fruit to their parents, and do not come into bearing until the third season, it is scarcely worth the amateur's while increasing his stock in this way.

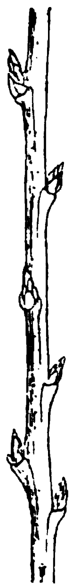

FIG. 159.—RASPBERRY.

Cuttings of the current year's wood may also be inserted in the open ground about the end of October, in the same way as recommended for Gooseberries, Currants, Roses &c. Each cutting should be 9–12 in. long, and be well ripened. It should be inserted in the soil about half its length, and have the soil firmly pressed round it. A fair percentage will root, and a fair percentage will not, so that Raspberries from cuttings cannot be regarded as any advantage in comparison with those from suckers, except when any particularly fine variety is increased by both methods.

Training. — Raspberry canes are supported in various ways to prevent them from being blown about too much by the wind, and also to expose them freely to the light and air. At the autumn pruning the tops of the canes of each clump may be tied together with a piece of string or bast. They may also be tied to wire trellises, each stem standing erect and free from its neighbour; or some of the stems of one clump may be arched over each way and tied to the stems of another clump.

General Cultivation. — Owing to the creeping nature of Raspberry roots, and their close proximity to the surface of the soil, digging or deeply forking the soil near the clumps is injurious to them. Unless suckers are required for increasing stock, they should always be pulled up or cut off, as they absorb a good deal of nourishment which can be better employed by the canes that are required. A heavy mulching of well-rotted manure or the remains of old mushroom beds around the stems is very beneficial to the roots, and may be applied in early winter or early spring. Weeds are also kept down by the mulching, and any odd ones that appear may be removed by hand or the application of the Dutch hoe. As a rule Raspberries grow for several years in the same place and bear abundantly, but it is essential that the ground should be more or less heavily dressed with manure every year, so that the soil shall not become exhausted.

VARIETIES OF SUMMER-FRUITING RASPBERRIES

Baumforth's Seedling.—This is an improved form of *Northumberland Fillbasket*, with large dark crimson fruits of excellent flavour. The plant is a vigorous grower, and the current year's canes often produce a few fruits in autumn.

Carter's Prolific.—This is a very heavy cropper, and produces large, round, deep red fruits, firm in flesh and excellent in flavour.

Fastolf.—An excellent Raspberry with large roundish conical fruits of a bright purple-red colour and good flavour.

Northumberland Fillbasket.—A vigorous variety with rather large, roundish, conical fruits of a deep red colour and fine flavour.

Semper Fidelis.—An excellent Raspberry for preserving purposes. The fruit has a rich bright red colour, with a slightly acid flavour. The canes bear abundantly.

Superlative.—This is a comparatively new variety of great excellence and quality. It bears large crops of rich red fruits.

Other good red varieties are *Red Antwerp* and *Hornet*, but *Superlative* may be regarded as at present the finest eating Raspberry, and *Semper Fidelis* the best for preserving.

Among the white or yellow Raspberries the best are *Magnum Bonum* and *Yellow Antwerp*.

Autumnal Raspberries.—Besides the ordinary summer-fruiting Raspberries, there are a few varieties which bear their fruits in autumn. They are not extensively cultivated, but they are worthy of a place where space can be afforded them, although the fruit does not equal in quality or flavour that produced by the Summer varieties.

The Autumn Raspberries bear their fruits on the canes of the current year, as well as on those produced the year previous. They require to be thinned out rather more than the summer-fruiting varieties, and may also receive heavier and more frequent mulchings of manure to produce good crops. After about six years the plants show signs of exhaustion, or rather the soil no longer contains sufficient food for them. It is then necessary to make a new plantation with young plants, and if in a fresh part of the garden so much the better. The following are the best kinds of Autumn Raspberries ripe in October:—

Belle de Fontenay, large, round, deep red, good flavour.

October Red, large, bright red; a heavy cropper, the spikes of fruit often being 12–18 in. long.

October Yellow.—A free-fruiting yellow variety with medium-sized fruits.

Enemies of the Raspberry.—These may be many, but with good cultivation and proper thinning out of the canes to admit light and air, very little damage seems to be done. A small maggot (*Tinea corticella*) sometimes attacks the flower-buds and fruits.

Its presence is detected by the withering of the flower-buds. These should be squeezed between the finger and thumb, and as they are rendered useless, may be picked off and burned at once. A dusting with lime and soot round the base of the plants in winter is a preventive against the attacks of the larvæ of beetles &c., which sometimes feed upon the roots.

THE LOGANBERRY. — A fruit under this name has attracted considerable attention during the past year or two. It is an American production, and receives its name from Judge Logan of the American Bar, who had grown it for some years in his garden. It is said to be a true hybrid between the Red Raspberry and the Blackberry, not at all an unlikely proceeding, considering the close relationship of the two. The 'berries' are like large Blackberries and of a deep reddish-maroon colour, ripe early in July in the south, and in August in the midlands and north. They are said to be 'rich in flavour—a mingling of the Blackberry and Raspberry, mellowed and refined,' but the few I tasted certainly did not give me this impression. The description, however, may have reference to berries grown in America, where the climate is more favourable to them than ours. Or, the fruits may have been produced by one of the plants referred to by Judge Logan writing in an American Agricultural Bulletin as follows:—'As I have before stated, the Loganberry is reproduced from seed, and while such seedlings are essentially Loganberries, not one in a thousand is equal to the original. Such seedlings are rank frauds when sent out as the Loganberry, and unprincipled nurserymen have been flooding the East with such seedlings, and wherever sent the result has been condemnation of the Loganberry. The bulk of the fruiting of this plant is in May, June, and July in America. However, the autumn crop is often of considerable importance.' For jams and jellies they are considered to be unequalled.

Culture and Propagation.—The plant has a trailing wiry habit, with dark green leathery foliage, and may be grown in waste places like Blackberries if desired.

The following particulars, for which I am indebted to Mr. Lewis Castle, Manager of the Duke of Bedford's Fruit Farm, at Woburn, will give the reader a good idea as to the treatment required to bring this plant to perfection in our climate. He says: 'My first experiences with this Rubus were rather disappointing, and I began to think that the prejudice formed against it was well founded. The fruits were sparsely produced and were little better than those of an ordinary Dewberry either in size or flavour, the only marked character being the great vigour of the plant. For two years it was grown with the long stems tied to upright stakes, but as the growth was so rampant I decided to try another method. Six stout stakes, each about 5 ft. high, were placed around the plants at 3 ft. from the centre, and the stems were then taken round these in succession in a spiral but near together so that they were nearly in a horizontal position. The result of this plan was most satisfactory: at every node short flowering laterals were produced which developed large handsome and distinctly flavoured fruits. A similar result has followed in each season since, and the Loganberry is now considered well worth the space it occupies, indeed the plantation has been extended. The fruiting stems, which frequently attain the length of 12–16 ft., are cut away at the end of the season and the current year's growths are trained in their places, much the same as with Raspberries, a liberal dressing of old manure is applied over the roots at the same time, and with a little thinning out where the growths are too thick, or shortening if the wood is immature and not likely to bear fruit, little attention is required. The plant is readily increased by division of the roots, or if the stems lie on the ground they root at the tips and produce strong young plants the same season.'

THE STRAWBERRY-RASPBERRY.—This peculiarity comes from Japan, and is reputed to be a hybrid between the Strawberry and Raspberry. Most people are sceptical on this point, as there seems to be little likeness to either of the reputed parents. The plant is quite hardy, with pale green leaves, snow-white and delicately fragrant flowers, which give place to large roundish berries, bigger than large Blackberries.

THE BLACK RASPBERRY.—This is a kind of large Blackberry of American origin, with large Blackberry-like fruits which ripen about the middle of July. The variety known as the 'Cumberland Black Cap' is said to be very hardy in our climate and produces large crops of excellent fruit suitable either for dessert or cooking. The flavour is exactly like our ordinary Blackberry.

THE STRAWBERRY (FRAGARIA). This is the last of the Rosaceous fruits described in this work, and differs from the others in being a herb and not a tree or shrub. Although the edible portion of a Strawberry is usually regarded as its fruit, it is in reality but the enlarged receptacle which has been rendered particularly succulent and deliciously flavoured by cultivation. The real fruits of the Strawberry are the small seed-like bodies called achenes, dotted spirally all over the surface of the fleshy receptacle. When Strawberries are raised from seeds, it is these 'achenes,' which contain the true seeds, that must be sown. It may also be pointed out that the Strawberry is not a true berry—the real berry being a pulpy or juicy fruit enclosed in which are several seeds, as in the Gooseberry and Currant, but not the Raspberry, Blackberry, or Mulberry. For ordinary purposes, however, it is generally found very convenient to refer loosely to the Strawberry both as a 'fruit' and a 'berry.'

Soil.—A rich moist and fairly heavy loam, such as would suit Roses, is the best all-round soil for Strawberries. Anything approaching a light gravelly shallow soil is useless, but where such exists it may be improved by the addition of clayey soil, and plenty of cow or stable manure. The soil must be well prepared by good digging or even trenching, at the same time incorporating with it a quantity of well-rotted manure, old leaf soil &c. at the bottom of the furrows in good soil, or rather fresh manure in poor soil. Where the land is always in good cultivation the necessity for heavy manuring is not so great. While the soil should be fairly moist and inclining rather to the heavy side, it is also essential that water should pass away freely and not lie in stagnant pools beneath or on the surface. The addition of a little river sand to a too heavy soil will improve its drainage a good deal. The subsoil should also be well broken up when digging or trenching. These operations may be performed in the summer time, June or July, say after a crop of early Potatoes or green stuff has been cleared away, and the soil will then be in a good condition for planting later on.

Time of Planting.—It is a mistake to plant Strawberries too late in the season, as neither the roots nor plants can become sufficiently well established before the cold, wet, and frosty weather; hence they suffer a good deal, even if they are not altogether killed. From the middle of August to the end of September is about the best period for planting Strawberries especially in dull showery weather. The young plants or 'runners' should be well rooted, and may be placed about 18 in. apart from each other, while a distance of 2 ft. between the rows will not be too much. It will admit of more easy mulching later on, and also allows greater freedom in picking the fruit. Sometimes a crop of green stuff can be taken off the land in between the rows before the Strawberries require mulching and picking.

Care must be taken not to plant too deeply. The fibrous roots require to be spread out carefully, but the crown or centre of the plant must not be in any way covered with the soil. After planting the soil should be firmly trodden round each plant. Neglect of this precaution often results in failure or bad crops.

Propagation.—The commonest way of multiplying Strawberry plants is by means of the creeping cord-like shoots known as 'runners' that root at the tip and produce young plants therefrom. Indeed, with choice and highly flavoured varieties this is not only the easiest but the best way, as the variety is then kept true. These runners are usually produced freely in summer. When full grown they may be pegged down or 'layered' to the ground at the tips where they lie, or into small pots about 3 in. wide at the top. The latter is on the whole the better method, as the young plants when well rooted are more easily detached from the parent plant and removed to the soil in which they are to be planted. Roots also suffer little injury when transferred from pots to the ground, whereas the runners layered in the soil are more or less injured at the roots when lifted. More attention, however, must be given to the plants in pots in regard to watering, until the time for planting them out has arrived. It is an excellent plan to place the rooted runners in pots (when detached from the parent plants) under the shade of a north wall for a week or two, so as to enable them to become thoroughly established before planting out as mentioned above.

Where there are frames in a garden, a good way to obtain a crop of Strawberries to follow those forced in greenhouses, and to fruit before those in the open air, is to take the runners a little earlier than usual, and plant out as advised above when well rooted. They may be left in the open border during the autumn and winter months, but in March they may be carefully lifted with a good ball of soil and planted in the cold frames. The plants should be kept close for a week or so, but cold draughts should always be avoided.

Besides runners, Strawberries may also be increased by division of the 'stools' or rootstocks, but this method although easy is not to be recommended, as plants thus produced never attain the vigour and fruitfulness of runners. New varieties are raised from seeds. The latter are saved from the choicest varieties, the flowers of which have as a rule been fertilised with pollen from equally fine varieties having some distinct and desirable peculiarity not present in the others. The seeds may be sown as soon as ripe or in spring, in prepared beds of light loamy soil in warm parts of the garden, but where hotbeds and cold frames exist it is better to sow under their protection either in small beds or in boxes or pans &c. The young plants will require pricking out and transplanting in due course, but will not bear fruit properly for two or three seasons.

What are known as Alpine Strawberries are usually raised from seeds sown in spring every year in the way mentioned. When brought on in gentle heat, the plants are transferred to the open ground in favourable weather about the end of May. After the second season they are practically useless and may be thrown away, the stock in the meantime being kept up by the annual sowing of seeds. The 'Perpetual' Strawberries referred to below are varieties of the Alpine Strawberry, and are now receiving much attention from good growers.

General Cultivation. — Except when new plants are required all runners should be cut off as soon as they appear, as they weaken the main plant. The soil near rows of Strawberries should never be dug, as the roots would not only be much injured by the process, but, as stated above, they like the soil around them to be very firm. When growth has well started in spring, a mulching of well-rotted manure or the remains of old mushroom beds may be given. Over this mulching, which is very valuable in hot seasons, a covering of clean straw or litter may be placed as the flower-buds are about to open. This will keep the fruits clean while ripening, and prevent mud-splashes by heavy rains. Weeds also are prevented from growing by this means.

Plants two to three years old produce the best and heaviest crops of fruit, and after the third, or not later than the fourth year, they should be thrown away. In the meantime in another part of the garden a new Strawberry bed of young plants should have been arranged. Four years is quite long enough to grow Strawberries on the same piece of ground, even with plenty of manure. (See Rotation of Crops, p. 1104.)

Strawberries in Pots. — Where cold frames and hotbeds exist, Strawberries may be obtained in fruit earlier under these structures than in the open air. Having obtained new strong well-rooted plants by layering as described above, they should be placed in well-drained pots 5–6 in. across, and usually in a rich fibrous loam. The soil should be very firmly packed round the roots, and thoroughly soaked afterwards. For a few days, until the plants have recovered from the disturbance, they should be stood in a shaded spot, but afterwards they cannot have too much sun and air to develop and ripen their growth. The greatest attention must be given to watering, taking care that the plants never become very dry or the young roots will be shrivelled up. On the approach of cold frosty weather the plants may be removed to the cold frames; plunge the pots up to the rims in ashes or soil. They should be quite near the glass, and always have as much light and air as possible, except on very cold days, when the lights are best kept closed. At any convenient time after December 1 the plants may be removed to the forcing house where they are to ripen. A temperature of 45°–50° F. during the day will suit the plants perfectly at first. Watering and ventilation should always be carefully attended to, and a syringing under and over the foliage will be very beneficial and check the attacks of Red Spider. As the flower trusses begin to show, the temperature may be increased to about 55°, and syringing should be discontinued after the blooms open, although the atmosphere may be kept in a fairly moist condition by watering the soil, boards, or shelves around the plants. Care, however, must be taken that on cold or dull wet days too much moisture does not exist, as at this season Strawberries are very liable to be attacked by mildew, which completely spoils the appearance of the fruits. When the fruits have set well, only the finest should be retained for ripening, all the small and worthless ones being removed from each truss. To assist the plants at this stage, a little liquid manure may be given two or three times a week, until the fruits begin to colour. Then pure water is best, and the plants should be placed in a drier and more airy place if possible, with plenty of sunlight to bring the fruit to maturity.

Where greenhouses and conservatories exist there is very little difficulty in obtaining early Strawberries in pots in this way. The plants need not all be forced into fruit at the same period. This may be arranged by taking a few from the cold frame to the somewhat warmer temperature at intervals of a week or a fortnight, as required.

After fruiting, the plants may be transplanted in the open ground at the end of May or beginning of June, in warm sheltered spots, and if they have not been allowed to bear too heavily, will very likely produce a second crop of fruit in autumn in the open air if the season has been at all a good one. To increase the chance of obtaining a second crop of fruit, it is safer to grow the plants in frames in good soil, as they can then be protected in autumn in the event of bad weather.

Enemies.—Outdoor Strawberries are sometimes preyed upon by caterpillars, slugs, snails, and the larvæ of a little beetle called *Otiorhynchus sulcatus*. Picking by hand and destroying under foot will put an end to the larger marauders, and a dressing of soot and lime in winter or early spring on the soil round the plants will also be a great preventive against most of them, large and small. Mice often disfigure the fruit by eating the seeds, and must be diligently trapped until they are exterminated.

VARIETIES OF STRAWBERRY TO GROW

There are about 200 varieties of Strawberries, which have been described at one time or another, but many—perhaps the great majority—exist no longer, except in name. The following varieties will be found the most serviceable for outdoor cultivation, but will also stand forcing well. They have been arranged as nearly as possible in the order of ripening.

It must not be taken for granted, however, that they will succeed equally well in all parts of the country, and it is not unusual to hear glowing accounts and exactly the reverse from gardeners who grow the same variety, and who perhaps obtained their plants from the same source.

Royal Sovereign.—This is a very early vigorous variety with very large conical fruits of delicious flavour. It is comparatively new, but has already found its way into almost every garden, both for outdoor and indoor cultivation. It bears abundantly, but in some soils lacks flavour.

Keen's Seedling.—This variety was raised in Isleworth as long ago as 1820, and still retains its hold upon gardeners. It has large deep crimson fruits, with a brisk and agreeable flavour.

Sir Joseph Paxton.—An excellent Strawberry for the open air and also for forcing. The fruit is large and handsome, solid, and highly flavoured.

Dr. Hogg.—This is an excellent and good all-round Strawberry with very large fruits, rich and highly flavoured.

La Grosse Sucrée.—This is an excellent and highly flavoured variety, and well adapted for forcing. The fruit is large, deep glossy red.

Vicomtesse Héricart de Thury.—This is a grand Strawberry, although not of the largest size, conical, bright red, with a brisk rich flavour. It bears abundantly, and is very hardy as well as good for forcing.

President. — An excellent open air Strawberry, large, deep crimson, with a firm flesh and high flavour. Also good for forcing.

Waterloo. — This is a very highly flavoured late Strawberry, although its peculiar deep purplish-crimson colour when fully ripe is not very attractive.

Latest of All.—This is a new late Strawberry with large fruits of a rich and pleasant flavour. In some poor soils it is apt to be one of the first to ripen.

The above varieties will give a good succession from the earliest to the latest. Where space for other varieties exists, the following sorts arranged in the order of ripening may also be grown if desired: *King of the Earlies*, *Auguste Nicaise*, *Lord Suffield*, *Gunton Park*, *British Queen*, *Noble*, a fine-flavoured and good all-round Strawberry in some localities, and *Elton*, the latter being particularly suitable for preserving. *Garibaldi* is still a great favourite in the North.

PERPETUAL STRAWBERRIES

Within the past two or three years great attention has been called to some varieties of the Alpine Strawberry which promise to extend the Strawberry season from early summer to late autumn. The variety best known at present is *St. Joseph*, but what appears to be an equally good one is that called *St. Anthony of Padua*. They are both of French origin, and worth growing in all gardens

Culture and Propagation. — Perpetual Strawberries may be grown in the same soil and situation as the other varieties, but they prefer a light moist loam, and a partially shaded place. They are, however, not increased by runners, although they produce many. When these appear they should always be severed from the plants, as they are only a strain and an obstacle to fruiting.

Seeds may be sown during April in a cold frame, and also out of doors in May in prepared beds. To obtain good sturdy plants, the seedlings should be transplanted from the seed bed once or twice during the year in showery weather. About the end of September or during October, according to the weather, the plants are finally transplanted about 18 in. apart to the ground in which they are to fruit the following year. The first crops of fruit will appear in June, about the same time as the ordinary early kinds, but they continue to flower and fruit without intermission up to the middle of October in good seasons. To make them last even longer than this, the plants may be covered with lights if there is a prospect of obtaining more fruit. After the fruiting period is over the plants may either be pulled up and thrown away or kept on until the following season to produce an early crop. In any case seed should be sown every spring as stated above, so that a new plantation is made every autumn. By retaining the fruiting plants of the previous year for the first crop the following year, the first flower trusses may be pinched out of the plants put out the previous autumn. In this way the late summer and autumn crops will be heavier and finer.

THE GOOSEBERRY (Ribes Grossularia). — The Gooseberry belongs to the genus Ribes, the characters of which are given at p. 486. It is indigenous to England and the temperate parts of Europe and Asia, and may be regarded as the hardiest of all our cultivated fruits.

A few years ago a so-called 'spineless' or thornless Gooseberry raised in France attracted a good deal of attention, and not unnaturally, as the gathering of berries usually makes one thoroughly acquainted with the numerous sharp spines. There are generally 1–3 of these jutting out like bayonets beneath each bud on the branches. The fruit of the spineless Gooseberry, however, possessed no particular merit, and the plants unfortunately developed spines in due course. They were supposed to have been ordinary Gooseberries grafted on stocks of the Currant.

Soil.—The Gooseberry flourishes in ordinary good garden soil which is well drained and neither too light nor too heavy in texture. In fact a good Raspberry soil will also suit Gooseberries and Currants.

The Gooseberry succeeds better in the cooler and moister climate of the north of England and Scotland than it does in the warmer and drier parts of the south of England. It is therefore desirable, in selecting a position for Gooseberries in the south of England, to find a rather cool, moist, and partially shaded one, such as between rows of fruit trees that are not too close together. In the north of England and Scotland the bushes may be planted in the open sunshine, while in Ireland, which is on the whole more moist than England and not so cold as Scotland, the cultivator must likewise seek a favourable situation, and one facing north would be useful.

Planting.—The period of planting is from the middle of October to the end of November, as for Raspberries. The bushes should be at least 5–6 ft. apart, and on no account should they be planted too deeply, as this causes the development of suckers from the base of the stems (see article on Planting Fruit Trees, p. 1082).

The soil should always be well prepared and dug a few weeks before planting, and may receive a more or less heavy dressing of well-rotted manure according to its condition.

Pruning. — Established bushes only require to have their main or leading branches shortened back to about 6 inches, more or less, according to whether the bush is required to increase in size or not; and the side shoots cut back to two or three buds. This operation is best done in winter. In early summer, however, say early in June, if time can be spared, it is a good plan to remove all side shoots, buds &c. that are not required. If these are allowed to remain, they not only choke up the centre of the bush, stopping air and light and preventing ripening of the wood, but they also absorb a good deal of sap that would be useful to the main shoots for swelling the fruit-buds for the following season. Attention to this little detail of summer pruning will be as beneficial to Gooseberries as to Apples, Pears &c. The illustration, fig. 160, shows a branch of the Gooseberry. The portion marked A shows the young growth with wood-buds at *w*; while at B the flower-buds are shown at *f*.

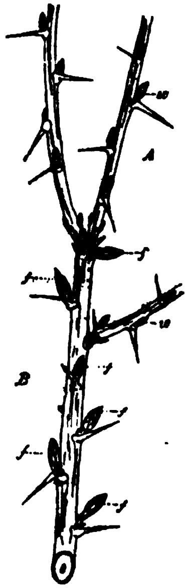

FIG. 160.—GOOSEBERRY.

Mulching.—When the fruits are well set in spring, a good layer of litter or manure may be placed round the plants. This mulching will increase the size and flavour of the fruits, keep down weeds, and prevent undue evaporation from the soil during the hot weather. In winter the remains of it may be forked into the soil after the bushes are pruned and tidied up for the following season.

Propagation.—Gooseberries are best increased by means of cuttings, but may also be increased by seeds when new varieties are desired, by layers, and by suckers. As the last three methods are rarely practised, it is only necessary to refer here to cuttings. These should be not less nor more than 12–15 in. long, and should consist of stout well-ripened shoots as straight as possible. All the buds, except three or four good ones on the upper half of the cutting, should be rubbed off with the finger and thumb or a sharp knife. From the time the leaves drop until the end of November is the best period for inserting Gooseberry cuttings. They should be put about 3 or 4 in. deep into a fairly light rich loamy soil, and about 6 in. apart each way. The soil should be packed round them firmly, and they require little attention beyond keeping the weeds down, until the following autumn. Then they may be transplanted if they have made good growth, or if not too close together may be allowed to remain where they are for another year. They should, however, be transplanted at least once before they are finally moved to their permanent quarters, as this induces a good fibrous root system. As a rule, the fourth year, but sometimes the third, according to vigour and the variety, the plants from cuttings are shifted for the last time.

The pruning of young plants from cuttings is a rather important operation, and should not be neglected, as the shape and usefulness of the future bush depend upon it. When the three or four buds left on the cutting develop they each make growths a foot or more long the first season. These growths in winter must each be cut back to three or four buds, and the foot or so of stem below them should also be kept quite clear of buds or growths, so that it will make a strong leg upon which the bush will ultimately stand, and keep its branches and fruits out of the soil. The second season the buds of the shortened shoots will each make growths, and in winter these are cut back to three or four buds in the same way. There will thus be 12 to 16 main shoots forming the framework of the bush at the beginning of the third year. The buds on each of them will push forth growths during the season, but at pruning it is not necessary to cut them back so severely as on the two previous occasions. About 9–12 in. of each may be left, and so on each year until the bush has reached the required dimensions, when the ordinary pruning operations described above for established plants become the general practice.

Training Gooseberries. — Although usually grown in bush form, Gooseberries are amenable to training against walls and trellises much in the same way as Apples, Pears &c. Of late years they have been grown successfully in pots in many places where orchard houses exist for the early production of other fruits, like Apples, Pears, Plums, Cherries, Peaches, and Nectarines, the culture of which in pots is becoming every year more popular (see p. 1040).

In warm localities Gooseberries may be trained against a north wall with excellent results. The fruits ripen later but have the advantage of lasting longer. In the northern parts of Scotland Gooseberries grown in this way, with a similar aspect, and kept shaded with mats or canvas after ripening, may often be kept in excellent condition as late as August and September. When grown as espaliers or upright cordons the side shoots must be pruned back to two or three buds.

Insects &c.—The caterpillars of the well-known Gooseberry or Magpie Moth (*Abraxus grossulariata*) often do a good deal of damage by eating the leaves, and after three or four weeks' marauding drop to the ground beneath, where they remain in a chrysalis state until the following spring. These pests may be checked by hand-picking and foot-crunching, or better still by dusting the bushes early in the morning, when the dew is still on the foliage, with a mixture of lime and soot. This is not ornamental, but very effective, and should be repeated when the pests are in strong force. A syringing with clean water or a heavy downpour of rain will soon restore the bushes to their normal appearance.

The reddish-brown appearance of Gooseberry leaves is caused by the Gooseberry Mite (*Bryobia pretiosa*), which is very small and apt to be overlooked. Spraying the bushes with a hot solution of soft soap, quassia, tobacco water &c., as recommended for Plums (p. 1071), will be useful, care being taken to wet the under surface of the leaves, as it is there the pests chiefly congregate.

VARIETIES OF GOOSEBERRIES

About 300 different varieties of Gooseberries have been described, and a fairly large number are still to be found mentioned in nurserymen's catalogues. The berries (they are real berries in the botanical sense) vary in shape from round to oblong, oval and obovoid, while some are large and others small.

In colour they are grouped in four classes, according to the colour of the skin, namely red, yellow, green, and whitish, each of which groups has hairy-skinned, smooth, or downy varieties.

It is quite unnecessary even in the largest gardens to grow many varieties of Gooseberries. Only the best for flavour or cooking are worth growing, although some like to have large-fruited varieties (some of which weigh from 30 to 35 dwts.) that look very well at exhibitions, but are of no particular value for either dessert, cooking, or preserving, and it is therefore difficult to understand why time, money, and labour are spent in their cultivation.

The following list of first-class useful varieties does not pretend to be an exhaustive one, and perhaps another equally as good could be made out. The varieties mentioned, however, have received recognition by extensive cultivation in some of the best gardens in the kingdom, and are therefore worthy of attention.

It may be mentioned that all Gooseberries in a green state are useful for cooking purposes, but those marked with an asterisk * are more so than others. Where large and fine ripe fruits for dessert are required, it will greatly benefit the bushes to pick or thin out most of the fruits in a green state, leaving only the finest berries to ripen. Of course the green young fruits are useful for tarts &c. and need not be wasted.

Red-skinned Gooseberries

* **Crown Bob.**—Fruit large roundish oblong, hairy, good flavour, heavy cropper.

Dan's Mistake.—Fruit very large, hairy, good flavour. A good market garden variety, and also for exhibition.

Ironmonger.—Fruit small, hairy, good flavour.

Red Champagne.—Fruit small, roundish oblong, hairy, superior in flavour to *Ironmonger*. The bush bears abundantly.

Red Warrington.—An excellent Gooseberry, roundish oblong, hairy, late, hangs well in autumn.

Other good red varieties are *Dr. Hogg*, *Keen's Seedling*, * *Lancashire Lad*, *Lion's Provider*, * *Rifleman*, *Rough Red*, * *Whinham's Industry*, and *Wilmot's Early Red.*

Yellow-skinned Gooseberries

Broom Girl.—An early and first-rate Gooseberry, dark yellow, hairy, fine flavour.

Early Sulphur (or **Golden Drop**).—Fruit pale yellow, large, smooth, early; fine flavour.

Leader.—Fruit greenish-yellow, medium, smooth, rich flavour; early.

Yellow Champagne.—One of the best yellow varieties. Fruit small, hairy, rich flavour; late.

Other varieties in this section are

Catherina, *Leveller*, *Mount Pleasant*, and *Trumpeter*.

Green-skinned Gooseberries

Keepsake. — Fruit large, smooth or slightly hairy, good flavour, early.

Matchless.—Fruit large, good flavour.

Thunder. — Fruit large, roundish, hairy, excellent flavour, early.

White-skinned Gooseberries

Snowdrop.—Fruit very large, roundish, highly flavoured. Skin white with broad green veins, hairy.

White Champagne. — Fruit small, hairy, sweet and rich flavour.

* **Whitesmith.**—Fruit large, downy, roundish oblong, very fine flavour, rather early.

THE CURRANT (RIBES NIGRUM and R. RUBRUM).—The Currant is a first cousin, so to speak, of the Gooseberry, and indeed belongs to the same genus (*Ribes*), the characteristics of which are given at p. 486.

There are three distinct varieties of Currant grown for their fruits, namely, the Black Currant (*R. nigrum*), the Red Currant (*R. rubrum*), and the White Currant, which is a botanical variety of the same species. They all flourish in a good garden soil, well drained, and not too heavy in texture. In fact, they may receive precisely the same treatment as recommended for Gooseberries, but the soil may be, if anything, somewhat richer and heavier. The ground may be mulched and manured in the same way, and the plants may be grown not only as bushes, but likewise against walls and trellises. The heaviest crops, however, are obtained from bushes, and they require less attention. The distance between them may be the same as for Gooseberries, and in the south of England they produce heavy crops either in an open sunny position, or partially shaded between rows of Apples, Pears, and Plums. The best time for planting is the same as for Gooseberries, from the middle of October to the end of November (see p. 1092), and new plants may be raised from cuttings in exactly the same way as Gooseberries (see p. 1093). The advantage of having Red and White Currant bushes on a clean stem about 1 ft. long may be emphasised here, as in the case of Gooseberries, as the lower branches are then kept free from the soil (into which they root readily), and the fruits are not splashed with mud during heavy rains. Black Currants are scarcely suitable for growing on a stem, and may be allowed to develop their shoots from the surface of the soil.

Pruning.—There is a great difference in the habit of growth between Black Currants on the one hand and Red and White Currants on the other, and it is most important to bear this fact in mind at the time of pruning. Red and White Currants may be pruned at the same time and in the same way as recommended for Gooseberries, that is, by shortening back the tops of the main shoots, and cutting the side branches back to two or three buds. The superflous growths and buds may also be removed early in summer (see Pruning Gooseberries, p. 1092).

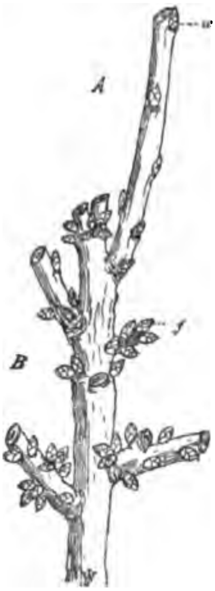

FIG. 161.—RED CURRANT.

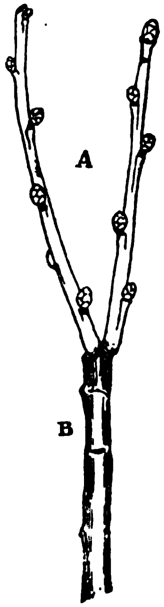

FIG. 162.—BLACK CURRANT.

Fig. 161 represents a branch of the Red Currant, which shows the fruit-buds (*f*) borne on the wood, B, 2 to 3 years old, and not on the shoots ripened the previous year (shown at A), which is furnished only with wood-buds (*w*).

Black Currants do not produce their berries in long drooping racemes chiefly from the old wood, in the same way as the Red and White varieties, but in irregular clusters on the new wood produced the year before. The point therefore to be remembered in pruning Black Currants is to cut away the old wood and leave the young, as it is from the latter the fruits are developed. If the shoots are very long they may be just topped, and all intercrossing branches should be cut out.

Fig. 162 shows how the young wood of the Black Currant at A is furnished with fruit-buds, while the older wood shown at B is without fruit-buds.

Insect Pests &c.—Currants, like Gooseberries, are not often troubled with insect pests so long as they are kept fairly well cultivated. Sometimes, however, the Black Currant, even when well cultivated, is attacked by a mite (*Phytoptus ribis*) which attacks and feeds upon the unopened buds, and completely destroys them and the prospect of fruit. In autumn and winter the presence of this mite may be detected by the much swollen and abnormal condition of the buds. Hand-picking and immediate burning of such buds is the only real remedy at this period, but where attacks are expected, the bushes may be sprayed with Paris green (see p. 1047) in early summer when the females are depositing their eggs.

In the case of caterpillars from the Gooseberry, or other moths, the bushes may be dusted with lime and soot early in the morning when the dew is still on them, or in the evening after syringing the plants to wet the foliage, so that the lime and soot will adhere to it. Birds destroy the buds in spring and may be checked by netting the bushes with black cotton.

VARIETIES OF CURRANTS TO GROW

Black.—The fruits of the Black varieties are mostly used for cooking and preserving, being somewhat too pungent for dessert. The best kinds to grow are (1) *Lee's Prolific*, which usually bears very heavily, the berries being tender, sweet, and richly flavoured; and (2) *Baldwin's* or *Carter's Champion*, which is almost equally good. Where another variety is required, *Black Naples* should be grown.

Red.—The fruits of the Red varieties are valuable for tarts &c. in conjunction with Raspberries, but may also be used with the White varieties for dessert. Perhaps *Raby Castle* and *Red Dutch* are the two very best varieties to grow for flavour. *Comet*, however, is a grand Red Currant which has appeared within the last few years. The brilliant red berries are as large as small Cherries, and there are often as many as 26 on a bunch. They have an excellent flavour. It is a variety worth growing.

White Currants.—These are used almost exclusively for dessert, and one variety called the *White Dutch* is quite enough to grow. The bunches and berries are large and freely produced, while the flavour is mild and sweet.

THE FIG (FICUS CARICA).—Although the Fig tree is hardy in most parts of England and Ireland and the south-west of Scotland, still it is not extensively grown in the open air as a fruit tree, but rather as an ornament for covering bare walls with its luxuriant lobed and leathery foliage. It is a native of the Mediterranean region and south-western Asia, and under cultivation in those regions usually produces two and sometimes three crops of fruit in one year. The result of these we see chiefly in a preserved state in this country.

The familiar Fig fruit (which is botanically called a 'syconus') is really a hollow receptacle—somewhat like a Strawberry would be turned outside in—nearly closed at the top, and bearing staminate and pistillate flowers separately on the inner surface. The pistillate flowers occupy the lower portion of the cavity, and are fertilised by the pollen from the upper staminate ones. Fertilisation, however, is not essential to the ripening of the fleshy receptacle which is eaten as the fruit.

If the Fig is grown in the open air in the British Islands for its fruit, it must be grown in the warmest and most sheltered places, and treated pretty much in the same way as the Peach and Nectarine as regards soil and aspect, against south or south-west walls (see p. 1034). The trees are best planted about March and April, in mild weather, spreading the roots out carefully as recommended at p. 1032, and making the soil very firm round them afterwards.

Autumn planting, as with other fruit trees, is not advisable in the case of the Fig, as the more or less severe wintry weather may seriously injure if not quite kill trees only partly established.

The shoots are attached to the walls

so as not to be crowded, and to allow the admission of plenty of light and air. Once established Fig trees require little care beyond cutting away unnecessary growths and keeping the young shoots pinched back to three or four leaves during the summer months. The main leading growths must not be stopped or shortened at pruning time, as the fruits are always produced near the points, as shown in the drawing. If this practice is attended to every year, there will be no need to use the knife, which as a rule does more harm than good to the fruiting properties of the Fig.

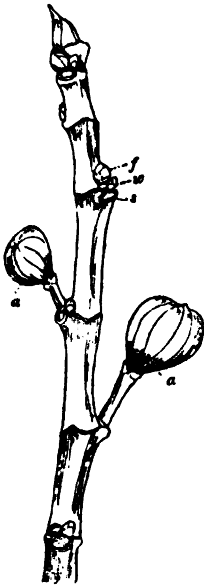

FIG. 163.—THE FIG.

The young Figs appear almost with the shoots in spring, and these are the fruits that ripen during the summer if not too much crowded and shaded by the foliage. In the drawing, which was made at Christmas time, *f* represents the bud which will produce the first fruit; *w* the wood-bud from which a new branch will spring, and *s* the scar left by the fallen leaf. Young fruits are often produced late in the season, as shown in the sketch at *a*, but as they have no possible chance of ripening out of doors in our climate, they are best removed.

Established trees are benefited greatly by a good mulching of manure when carrying a heavy crop, but otherwise they require little or no stimulant.

Propagation.—Figs are increased by suckers, layers, cuttings, and seeds. Cuttings, however, are usually employed. They consist of a ripened and dormant shoot 6–9 in. long, each one placed in a pot containing rich sandy loam, and plunged in bottom heat under glass, about January or February. They very soon root and the plants may be grown on in pots for the first year, placing them out of doors during the summer months to thoroughly ripen the wood for the next season. In the absence of heat for cuttings, the branches may be layered out of doors during the summer months, and the new plants detached the following March or April at planting time. Root suckers also may be detached and replanted at this period.

Varieties.—There are many named varieties of Figs cultivated under glass, but only a few are fit for fruit culture in the open air. *Brown Turkey*, with large pear-shaped brownish-purple fruits, is one of the best, and to it may be added *Black Ischia*, *White Marseilles* and *St. John's*.

THE GRAPE VINE (VITIS VINIFERA).—The cultivation of the Grape Vine (the botanical characters of which are described at p. 807 under *Vitis*) is now so generally associated with greenhouses and hot-water pipes that many imagine that it would be merely waste of time attempting to secure a crop of the wholesome and luscious fruit in the open air in the British Islands. It is of course true to a very great extent that the finest fruits can be obtained from the Grape Vine only when grown under glass; but notwithstanding this, very respectable Grapes with an excellent flavour can be produced in the milder parts of the United Kingdom, especially during hot and sunny seasons. Indeed in many old gardens Vines may still be seen trained on walls, the sides of houses &c., and where the owner takes an interest in their cultivation a fair amount of palatable fruit is secured in favourable seasons. From the time of the Romans until about the middle of the eighteenth century the Vine was rather extensively grown in these Islands, especially in the south and west, for the production of wine, and although our climate may have undergone some changes since that period it is probable that the outdoor cultivation of the Vine has diminished from other causes than that of climate.

The late Marquis of Bute in our own day showed that it is not impossible to grow the Vine in the open air, and that its culture can even be regarded as a commercial success. In 1875 he had three acres of Vines planted on his estate at Cardiff Castle, and in 1886 another vineyard of about 11 acres was started for the production of wine, which goes by the name of 'Castle Coch.' Some seasons have been more favourable than others, but in 1881 an excellent wine, like a first-class still Champagne, was produced and sold at 60 shillings per dozen bottles.

Site.—To secure the best results Vines should be grown in the open air in a warm sunny and sheltered position facing due south. It is essential to secure as much warmth and light as possible, so that the stems or 'canes' of the Vine may be ripened thoroughly, and also that the berries may ripen quickly, colour well, and receive that flavour which only sun-heat can impart.

Soil.—The most suitable soil for the Vine is a rich and rather stiffish turfy loam deeply dug or trenched, and resting if possible on a limestone or chalky sub-soil; failing this a certain amount of old mortar rubbish should be mixed with it. Good drainage is essential, otherwise stagnant moisture in the soil will keep the temperature low and prevent the roots from performing their proper functions of absorption as explained at p. 27.

Manures.—It is a mistake to give Vines a strong and quick-acting manure. Blood is often recommended, but it partakes too much of a quick stimulant. Farmyard or stable manure should also be avoided, as it often generates mildew and other fungoid diseases. Cow manure, while excellent for many plants, seems to sour the soil somewhat, and if given should be well decomposed and used chiefly as a mulching or top-dressing. The most suitable manures for Vines consist of bone-meal, horn shavings and other phosphatic manures which are chiefly valuable for producing the early ripening of the fruit. Potash is also a very necessary manure for Vines, as it increases the quality and flavour of the berries. Nitrate of potash and sulphate of lime are good Vine manures, but like the others mentioned they must be used carefully—about a pound of the various substances when mixed together to the square yard being usually sufficient. There are certain good concentrated Vine manures on the market, and these may be used with advantage by those who do not care to experiment with the others mentioned.

Training.—Vines may be trained on walls or the gable ends of houses, either on straight single stems like upright cordons, or they may be grown espalier fashion as represented at fig. 146. In the Marquis of Bute's vineyards already referred to, they are grown in the open in rows running north and south. The plants are 3 feet apart every way, and are trained to stakes about 4 feet high, the whole resembling a Raspberry plantation as much as anything else. Except in the mildest parts of the kingdom, it is safer to give the plants the protection of a south wall as for Peaches and Nectarines, as they are then more likely to yield the best results.

Disbudding and Pinching. — Each stem or cane should not be allowed to carry too many trusses of flowers, otherwise the plant may exhaust itself in a few years. The side shoots from the main stem should also be pinched back to the first joint, and as the tendrils are not required in a cultivated state they may be pinched clean out as they appear. The flower trusses also when they have set their fruits should have the small berries thinned out with a small pair of scissors, care being taken to leave the whole bunch as symmetrical as possible, after removing such berries as interfere with others or are not likely to be well situated for ripening properly.

In favourable seasons Vines sometimes produce a second crop of flowers in autumn, but these should be pinched out when seen, as they only absorb nourishment that is required for the following year.

Pruning. — As a general rule this operation is best performed as soon as the leaves have withered and fallen and the sap is practically at a standstill. About the end of October is usually a good time for pruning outdoor Vines. The weakest canes are best cut away altogether, while the strong healthy ones may be cut back to about two or three buds from the base.

Propagation. — Vines may be propagated in many ways, by layers, cuttings, budding, grafting, inarching, and seeds. The easiest method of increasing outdoor Vines however is by means of cuttings. At the time of pruning, sound plump and well-ripened canes of the current year's growth may be selected and cut into lengths of about 1 ft. or 15 inches. These cuttings may be inserted in the soil during favourable weather any time up to February, much in the same way as cuttings of Gooseberries and Currants. They may be transplanted the following year in autumn to their permanent positions, so that the roots may recover from the shock before winter, but attention should have been given in the meantime to pinching out the side shoots, tendrils, and flower trusses, if any. Planting may also be done in spring time just as growth is about to commence. As a rule it is not wise to let young Vines bear fruit until about the third or fourth year after planting, so that they may first of all devote their energies to produce strong healthy and well-ripened 'canes.'

When grown in hothouses Vines are increased by cutting the canes into pieces 1½ to 2 in. long, each piece having a plump 'eye' or bud from which the new shoot is to spring. The cuttings are inserted in rich sandy soil, singly in small pots, and plunged in a gentle hotbed about January. Growth soon begins. The young plants are well syringed daily and the house is kept warm and close. As growth advances the young plants are moved into larger pots, and grown on as quickly as possible with heat and moisture, great care being taken to avoid cold draughts. The canes having attained the required length more air is admitted, but daily syringings are kept up until towards the autumn, all the side shoots, flower-clusters, and tendrils having been pinched out during the season as they appeared. As much light and air as possible are now given to ripen the canes.

Diseases &c.—In cold, wet, and sunless seasons the cultivation of the Vine in the open air is likely to cause disappointment. Not only does the wood remain unripened but the berries also, and in addition the plants are often attacked by mildew (*Sphærotheca pannosa*) and another fungus called *Oidium Tuckeri*, which latter gives the leaves the appearance of having been riddled with small shot. Leaves thus affected may be picked off and burned or they may be sprayed with very hot almost boiling water by means of a very fine syringe. If the plants are in berry, however, the syringing is apt—if not to do injury—to at least leave stains upon the berries, that may be seen when ripe and spoil the 'bloom' upon them. The dreaded *Phylloxera vastatrix*, which has done so much mischief in Continental vineyards, is an insect that happily seems to find little favour in our climate, although it actually made its appearance under glass some few years ago.

Vines for the open air. — There are several varieties of Grape that will succeed in the open air in our climate, but those that have proved most satisfactory are *Gamay Noir*, *Chasselas de Fontainebleau*, *Chasselas Rose*, *Chasselas Vibert*, *Royal Muscadine*, *Buckland Sweetwater*, *Moore's Early*, *July Frontignan*, *Black Hamburgh*, and a new German one called *Reine Olga*. The first named (*Gamay Noir*) is the principal kind grown on the Marquis of Bute's estates, as the gardener, Mr. Pettigrew, found it to flourish better than the others. It has, he says, a strong constitution, is a free grower, produces fruit in great abundance, and ripens thoroughly in fair seasons.

HAZEL or **COBNUTS** and **FILBERTS** (CORYLUS AVELLANA).—Cobnuts and Filberts belong to the genus Corylus which has already been described at p. 797. The distinction between the two is not very well understood. But it may be explained that the nuts which have husks as long as or longer than themselves are called 'Filberts,' while the nuts with husks shorter than themselves are called Hazel or Cobnuts. There are, however, intermediate stages in the length of the husks that render it often difficult to place a Nut in either category. And after all it is a matter of very little importance.

Soil.—Almost every old garden has one or more Nut trees growing in the most out of the way places, and allowed to look after themselves. And under such circumstances they bear fairly good crops of fruit nearly every season. Where, however, Nut trees are regarded with more favour, they may with advantage be grown in a deep rich and fairly heavy loamy soil, thoroughly drained by means of a gravelly or rocky subsoil. The distance between each tree should be 10–12 ft. The best time for planting is during October and November, observing the principles recommended for planting fruit trees generally at p. 1082.

Pruning.—This is rather an important operation with Nut trees, and requires to be done at the proper time. When the trees are grown in bush or vase form the main branches are allowed to grow about 6 ft. high, so that they are easily attended to in the matter of pruning and picking the fruits. In early summer the side shoots may be pinched back or broken to about 4 leaves, as recommended under summer pruning of fruit trees (p. 1084)

At this time it will be seen where the Nuts are forming from the tiny female flowers which appear in February and March on the same branch, but quite distinct from the long drooping male catkins, as shown in the Glossary, p. 2, fig. 7, and there will thus be little danger of spoiling the crop for the year. If not completely severed during the summer pruning the broken pieces may be removed with a sharp knife in the winter months, and any unnecessary and intercrossing twigs cut away at the same time.

Propagation.—Nut trees are increased by suckers, layers, grafting, and also by means of seeds. The latter method is scarcely ever practised, as the vast majority of the seedlings are worthless, when they do produce fruit. Where, however, stocks for grafting are required, they may be obtained in this way. Layers produce the best plants. The more or less flexible shoots from old stems which have been cut back are pegged down (see p. 59) in autumn or early winter, and are covered with about 8 in. of good soil at the point of junction with the ground. By the following autumn they will be well rooted and may be detached from the parent stem and planted out to remain for two or three years before finally transplanting. In the meantime attention must be paid to summer and winter pruning with the object of forming a good shaped tree.

Suckers are freely produced and may be removed and transplanted for increasing the stock in autumn, being treated in the same way as rooted layers. Where they are not required for this purpose they should be removed every year, as they absorb a good deal of nourishment required by the main plant.

Gathering the Nuts.—Cobs and Filberts should always be allowed to hang on the tree until thoroughly ripe, that is, when they become a deep rich brown and easily separate from the husks. If in large quantities, the Nuts should be stored in a cool dry and airy place.

Varieties to grow.—There are many kinds of Nuts, but the best for general cultivation are the *Kent* or *Lambert's Cob*, *Cosford*, *Red-skinned Filbert*, *Webb's Prize Cob Filbert*, *Duke of Edinburgh*, *Davianum Cob*, and the *Improved Cosford Cob*.

Enemies. — There are many insects which attack the Nut, but the whitish larvæ or grubs of the Nut-weevil (*Balaninus nucum*) are the most destructive. They arise from eggs deposited in the green young fruits by the female, who bores a hole in them with her long slender beak. The grubs when hatched proceed to feed upon the kernel of the Nuts, after which they bore their way out through the shell about September and pass into the chrysalis state in the soil at the base of the tree.

Spraying the trees with Paris green (p. 1047) about April and May would be likely to prevent the female from depositing her eggs in the young Nuts. In winter the soil should be removed from the base of the tree and burned when there has been a bad attack, and new soil well sprinkled with lime and soot may take its place.

The caterpillars of the Winter Moth sometimes destroy the foliage, but may be checked as recommended at p. 1062.

THE SWEET or SPANISH CHESTNUT (CASTANEA SATIVA).—This tree has already been referred to at p. 800 as an ornamental subject for parks and gardens. The culture and propagation there recommended are all that is necessary, even when the trees are valued for their fruits. In some parts of the country there are fine avenues of Sweet Chestnuts and they yield enormous numbers of nuts almost every year. *Devonshire Prolific* and *Downton* are the varieties best known.

THE WALNUT (JUGLANS REGIA).—After the remarks under the genus *Juglans* at p. 791 it is scarcely necessary to enlarge here on the culture of the Common Walnut. Everyone recognises the ornamental character of the tree, and the value and popularity of the fruits. Besides the Common Walnut, the other varieties of note are *Dwarf Prolific*, which reproduces itself true from seeds; *Highflyer* ripens earlier than the others; *Large-fruited*; *Late*, a late-flowering and free-fruiting variety; and the *Thin-shelled*, one of the best varieties with a tender shell.

THE MULBERRY (MORUS NIGRA). In many parts of the kingdom there are some grand old Mulberry trees, which, however, are regarded rather as ornamental adjuncts to the garden, more especially as lawn trees, than as fruit trees. In the southern and milder parts they make fine trees, but in the north they are best grown against a south wall. They produce their juicy Blackberry-like fruits with great regularity, and their brisk subacid flavour is highly esteemed by many as being cool and delicious. The genus *Morus* and its culture have already been described at p. 789.

CALENDAR OF WORK TO BE DONE IN THE HARDY FRUIT GARDEN FROM JANUARY TO DECEMBER

JANUARY

Gooseberries.—If attacked by birds or vermin the bushes may be more or less heavily dusted with soot and lime; or soot, lime, and a little soft soap well mixed in water may be sprayed over them.

Wall-Trees.—Plums and others not finished should be nailed up, the walls having been previously cleansed if necessary (as recommended at p. 1085) with soft-soapy water and petroleum.

Apples and **Pears.**—Scions of desirable varieties for grafting should be secured from plump and well-ripened shoots and 'heeled in' until wanted. The heads of trees to be grafted later on may also be cut off.

Raspberries.—These may be pruned and trained as advised at p. 1086.

FEBRUARY

Cherries. — Morello Cherries and other fruit trees still left loose should be nailed up.

MARCH

Grafting (p. 52).—This work may be proceeded with in favourable weather about the middle of the month when the sap has started to flow freely.

Apricots (p. 1083).—Protect blossoms with nets on walls.

Peaches (p. 1078).—Protect blossoms with nets on walls.

Figs (p. 1096).—These may be pruned, and all vacant spaces on the walls filled in with young shoots.

Planting.— Fruit trees and shrubs may be planted in the early part of the month if mild, and should be mulched and attended to as advised at p. 1032.

APRIL

Grafting (p. 52).—At intervals during the month look over the grafts made last month to see if injured, and fill up any cracks with clay if required.

Perpetual Strawberries (p. 1091). — Seeds may be sown in cold frames or in warm sheltered borders, and transplant the seedlings when large enough to handle easily.

MAY

Peaches and **Nectarines** (p. 1078).—Disbud plants on walls, and dust with tobacco-powder in case of insects. Thin out young wood.

Spraying.—Apples, Plums, and Pears may be sprayed with insecticides to prevent insect attacks, *see* 'Codlin Moth,' p. 1047, and 'Winter Moth,' p. 1062.

JUNE

Peaches and **Nectarines** (p. 1078).—Finish disbudding and lay in young growths against wall with twigs. Any fruits colouring about the end of the month should have leaves interfering with sunlight removed.

Plums (p. 1069).—The young growth or breast-wood may be shortened back on wall trees to 3 or 4 buds.

Apricots (p. 1083).—Shorten back young growths to 3 or 4 buds.

Spraying. — To prevent insect attacks, Apples, Plums, and Pears may be again sprayed with insecticides.

Gooseberries (p. 1092).—If time can be spared, any young shoots not wanted may be cut out.

JULY

Summer Pruning.—This practice, as detailed at p. 1034, may be attended to early in the month with espalier and wall trees. Where the fruit spurs are crowded cut out weak shoots.

Pears (p. 1059). — Look over crops on walls and thin out unlikely fruits. Summer prune those on walls.

Peaches, Nectarines (p. 1078), and **Apricots** (p. 1083).—A good mulching of decayed manure and a good watering will be beneficial. Thin out fruits still more if necessary to secure finest specimens.

Cherries (p. 1075).—Net the trees to protect from birds.

Figs (p. 1096).– Thin out young wood and tie in shoots required.

Nailing.—All young shoots required on wall trees should be fastened up.

Strawberries (p. 1088).—Sever runners not required, as they exhaust parent plant. Plant new beds on ground previously occupied by Potatoes.

Red Currants (p. 1095) and **Gooseberries** (p. 1092).—The young wood of these may be thinned out to give more light and air.

Lackey Moth (p. 1048).—This pest deposits her eggs about this period on the twigs of Apple and other fruit trees, and should be watched for and destroyed.

Budding.— Plums, Peaches, Nectarines, Apricots, Cherries, and other fruit trees not grafted in March, or those which failed, may be budded this month in the same way as Roses.

AUGUST

Wall Fruit.—Look over trees and tie in young wood wanted for next season, removing the rest. Net Morello Cherries. Give the borders a good soaking if the weather be dry, and also a good mulching.

Strawberries (p. 1088).—Strong plants may be put in a south border for early cropping, mulch and water well.

Apples (p. 1042).—Early kinds will be fit for gathering this month. Look out for ravages of the ' Lackey Moth ' referred to at p. 1048.

SEPTEMBER

Fruit Gathering.—Apples, Pears, Plums &c. will be fit for gathering this month.

Raspberries (p. 1085).—Thin out old growths as advised at p. 1086.

Root-pruning (p. 1031).—Any fruit trees likely to be benefited by this operation may be attended to at the end of this month and during October.

Slugworms (p. 1048).—From now onwards these pests sometimes attack fruit trees—especially Apples, and may be checked as advised.

Perpetual Strawberries (p. 1091).—Transplant seedlings from beds to fruiting positions in showery weather. If the plants which have been bearing fruit show signs of continuing, they may be covered with lights at night.

OCTOBER

Gathering.—All fruit should be gathered as it ripens.

Raspberries (p. 1085).—From the middle of the month new plantations may be made with the suckers detached from the old clumps.

Gooseberries (p. 1092) and **Currants** (p. 1095).—These may be planted from nursery beds, and cuttings inserted.

Grapes (p. 1097).—Outdoor Grapes should be pruned. Cut out all weak and useless ' canes ' and shorten back good ones to two or three buds from the base.

Grease-bands. — These may be placed around the trunks of fruit trees as a protection against the female moths of various injurious insects crawling up among the branches to lay their eggs. See p. 1046 for American Blight, Apple Blossom Weevil, Codlin Moth &c.

Canker.—Any trees showing signs of this disease should be looked over carefully, and remedies taken as mentioned at p. 1047.

Winter Moth (p. 1062).—A look-out should be kept for this pest now, and the females should be prevented from crawling up the stems.

NOVEMBER

Planting.—All kinds of fruit trees may be planted during November in favourable weather. The roots should be carefully examined and planting should be carried out as advised at p. 1032.

Pruning &c.—Various fruit trees and bushes may be attended to with the knife. Untie Peaches, Apricots, Nectarines &c. on walls if necessary and wash the walls with soft soap, sulphur, and paraffin. Plums and Pears may be attended to on west walls. Gooseberries and Red Currants may be dusted with lime and soot if subject to insect attacks.

Fruit borders (p. 1038).—Attend to digging &c. when vacant.

Cuttings.—Cuttings of Apples, Pears, and other fruit trees may be inserted or heeled in until a favourable opportunity occurs for doing the work.

DECEMBER

Pruning.—Plums (p. 1069) trained on east walls may be pruned and nailed if not already done. Apples (p. 1042) and Pears (p. 1059) should also be attended to on espaliers, and Morello Cherries (p. 1078) on north walls. Peaches, Nectarines, and Apricots on south walls should also be finished by the end of the month, especially in northern localities.

PART IV

THE VEGETABLE OR KITCHEN GARDEN

As the Vegetable and Fruit Garden are usually one and the same thing, it is unnecessary to repeat what has already been said at p. 1029 in regard to soil, situation, aspect, shelter &c., as what applies to one is equally applicable to the other.

Although some vegetable crops are grown well between bushes and under trees, a good open and sunny situation should always be secured if possible. Indeed, it is important that a large portion of the garden, unencumbered with fruit trees or bushes, except as borders and shelters, should be available for the cultivation of vegetables exclusively, so that the latter may be fully exposed to the beneficial light of the sun.

The production of first-class vegetables requires as much cultural skill and management as the production of fine flowers and fruits; and it is a mistake to assume that such well-known vegetables as Cabbages and Carrots, for example, are to be obtained without good cultivation and attention to details. By good cultivation I do not mean the production of large, coarse, and tasteless plants, which one still often sees on the exhibition table, but which happily are gradually becoming more rare. Vegetables are grown not to be looked at but to be eaten. Quality and flavour should therefore be the main points for consideration, and not mere size.

To secure both quality and flavour at their best, it is essential that attention should be given to the proper time for the cutting of each crop, otherwise the labours of cultivation will have been more or less useless. There is little sense in growing a crop of vegetables and then allowing them to waste by not being gathered when in a proper state of maturity. In the case of fruits no one dreams of allowing them to hang on the trees or bushes long after they are ripe; and the same principles should govern the treatment of vegetables. In private gardens it often happens that more plants of a particular crop have been grown than are really wanted, and what cannot be eaten is wasted. Sometimes the waste is excessive in more senses than one. Not only are the plants useless when they have passed their best, but the labour involved in cultivating them has been lost. The ground which they occupy has not been properly utilised, and the food which it contained has been absorbed by the plants which ultimately find their way to the rubbish heap. These are points that are worthy of consideration in all vegetable gardens whether great or small. Only those vegetables that are required and that will grow freely should find a place in the garden, and it is as great a mistake to have more varieties of vegetables than can be properly attended to, as all crops are then more or less neglected.

Perhaps the best advice to give in connection with the cultivation of vegetables, as indeed all other plants, is to keep the soil clean and always in a state of good cultivation. This is effected by means of the hoe, which should always be freely used among vegetables, and by digging, trenching, ridging up and other operations referred to in the earlier portion of this work, pp. 63–69. Not only are better crops produced thereby, but the attacks of insect pests and fungoid diseases are considerably checked, if not altogether prevented.

After removing a crop of vegetables it is not good practice to allow the ground to remain idle and become covered with weeds. It is far better to wheel some manure over it, if the soil is poor enough to require it, and to have the whole well dug and prepared for another crop. Should it be necessary to keep the soil idle for some time, even then it will be improved by turning it up very roughly in ridges so that the action of the weather will improve its texture and make it more fertile (see article on Soil, p. 61).

Rotation of Vegetable Crops.—Experience has proved that if a similar crop, say Cabbage, is grown year after year on the same piece of ground, without heavy manuring, in a couple of years there is a great falling off in the produce, and if the practice is persisted in, the crop ultimately fails to grow at all. Where the ground is heavily manured and a crop of a different nature, say Beans, is taken off in between, little or no harm is done, because the soil has had a short rest from its usual crop.

A reference to the chapter on Plant Foods and Manures (p. 69) shows that various ingredients more or less essential to the welfare of all plants are contained in the soil, from which they are absorbed by the roots. In the same way that man prefers one kind of food, and animals another, so it is with plants. Some kinds are particularly fond of certain foods in the soil, and some of others, and as long as that food or foods last the plant flourishes. But when it is exhausted the plant no longer obtains the food it enjoys, and the consequence is ill-health, sickness or disease, and starvation, just as it would be with a human being or an animal.

It is this well-known fact that necessitates the use of various manures, both natural and artificial. By their means the food required by any particular plant can be placed in the soil at the disposal of the roots; and the more vigorously a plant grows the more food it absorbs, and consequently the greater need of manuring the soil.

Yet, even with liberal supplies of manure, experience proves that the same soil and the same plant get 'sick' or tired of the same treatment, and the poor texture of the one and the debility of the other demand a change. This change is brought about by what is called the 'Rotation of Crops.' The principle consists in not growing a similar crop on the same piece of ground without an interval of at least one or two years. For example, it is not wise to always grow Cabbages, Brussels Sprouts, and other Cruciferous plants year after year on the same piece of land, even when well manured. After the first year, their place may be taken by Potatoes or Beans, and the year after by some other crop, and so on according to whatever crops are grown. By thus changing the crops year after year from one part of the garden to another, the soil undergoes great changes for the better. The roots of each crop act upon it in a different way and release foods which, although they may be of little use to one particular crop, may be of the greatest advantage to another. Not only has the 'rotation of crops' this good effect, but as it fertilises the soil, the need of heavy dressings of manure is materially lessened.

So long as the soil has a crop of a different nature upon it each year, it matters little in what order the various crops 'rotate' or follow each other, but the longer any particular crop is kept from occupying the same piece of ground, the better for the crop, the better for the soil, and the more economy with manures.

Arrangement of the Vegetables described.—The rotation of crops has in a great measure influenced the order in which the vegetables described in this work have been arranged. At first the alphabetical arrangement commended itself. But, as any particular vegetable is easily found by means of the Index at the end, it seemed to be scarcely worth while separating plants of a similar nature, like Carrots and Parsnips for instance, because their names began with a different letter. The plants have therefore been arranged more or less in their natural groups (i) because being of the same nature they require more or less similar treatment and conditions, and what suits one will as a rule suit the other, and *vice versâ*; (ii) because the plants of each group may rotate or succeed on the ground occupied the previous year by plants of another group; and (iii) that a system of rotation of vegetable crops is thus seen at a glance by such an arrangement of the plants as follows:—

GROUP I. *Cruciferous Crops*, such as Cabbage, Savoy, Cauliflower, Broccoli, Brussels Sprouts, Kale or Borecole, Turnips, Radishes, Seakale &c. (p. 1118 to p. 1123).

GROUP II. *Leguminous Crops*, such as Peas and Beans (p. 1123 to p. 1128).

GROUP III. *Umbelliferous Crops*, such as Carrots, Parsnips, Celery, and Parsley (p. 1128 to p. 1133).

GROUP IV. *Solanaceous Crops*, such as Potatoes and Tomatoes (p. 1133 to p. 1140).

GROUP V. *Composite Crops*, such as Globe and Jerusalem Artichokes, Cardoons, Lettuce &c. (p. 1140 to p. 1145).

GROUP VI. *Liliaceous Crops*, like Asparagus, Onions, Leeks, Shallots, Garlic &c. (p. 1145 to p. 1151).

GROUP VII. *Miscellaneous Crops*, such as Rhubarb, Beetroot, Spinach, Vegetable Marrows &c. (p. 1151 to p. 1160).

In addition to the above groups, the cultivation of Sweet Herbs and Mushrooms is also dealt with (p. 1160 to p. 1169).

For rotation purposes the crops in the first group may the following season be placed on the ground occupied by any of the crops in the other groups, except such as Asparagus and Rhubarb, which may be grown in the same soil with manuring for several years.

It is, however, unwise to rotate crops in each group with one another, especially if they have not grown well or have shown a tendency to disease.

For instance Cabbages should never succeed Cauliflowers, Brussels Sprouts, or any other Cruciferous crops, and *vice versâ*, but they will benefit by changing places with Peas, Beans, or any crop mentioned in the other groups. All kitchen gardeners should keep the principle of rotation of crops well in mind. It will save them a good deal of trouble and give them better crops.

Inter-cropping. — In many gardens, especially small ones, it is necessary to make the best possible use of the ground available for the cultivation of vegetables so as to secure the ripening of as many crops as possible in the course of the year. As some vegetables come to maturity quicker than others it is often possible to grow a quick crop and a slow crop together without injury to either, and, if anything, rather an advantage to both. In taking a quick-growing crop off the ground, the soil is disturbed as a natural consequence, weeds are suppressed, and the texture and fertilisation are generally improved. One often sees a crop of early Lettuce taken off the soil between rows of French Beans, Raspberries, Gooseberries, and Beetroot, while it is a more or less common practice to utilise the ridges between rows of Celery for the same purpose. In the same way a crop of Brussels Sprouts, Broccoli, Kale &c. may be planted between rows of Potatoes, and when the latter have been dug, the former will cover the ground in their place as if by magic, and come into use at a later season. This system of growing one crop between another may be appropriately termed 'inter-cropping,' and is somewhat akin to that described under the rotation of crops. It has not only the advantage of making the best possible use of the soil, but it necessitates giving each crop a full and proper amount of space. Indeed if the latter is not secured at the beginning the system might prove to be of more harm than use, as it would be very poor gardening to crowd the ground up too much to the exclusion of light and the circulation of air.

CALENDAR OF WORK IN THE KITCHEN GARDEN FROM JANUARY TO DECEMBER

Although the culture and propagation of the Vegetables usually grown in British gardens are detailed in the following pages, it seems advisable to give as it were a brief epitome of the operations which constitute a year's work in the Kitchen Garden. This has been attempted in the following 'Calendar,' which is intended to serve as a reminder of the work to be done during each month of the year. The notes have been made as concise as possible, and the subjects have been arranged in alphabetical order to facilitate reference. After each name the page is given at which fuller details of culture &c. are to be found, so that the reader may be able to turn at once to the information required on any particular crop in which he is interested.

Before proceeding to the monthly notes the following table of Kitchen Garden crops has been drawn up. The chief object in view has been to show at a glance the months in the year (1) during which the seeds of any particular vegetable are to be sown in the open air; (2) when the plants are to be divided or transplanted; or (3) planted out after they have been raised in cold frames or on hotbeds. It will be noticed that the months of March, April, and May are the busiest; February and June the next; while during the three last months there is practically nothing done in the way of seed sowing, and only a little in January and September.

Table showing the months during which vegetable seeds may be either (i.) sown in the open air; (ii.) divided and transplanted; or (iii.) planted out after the seeds have been raised under glass.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Artichoke, Globe, p. 1141	—	—	*	*	—	—	—	—	—	—	—	—
,, Jerusalem, p. 1140	—	*	*	—	—	—	—	—	—	—	—	—
Asparagus, p. 1145	—	—	*	*	—	—	—	—	—	—	—	—
Beans, Broad, p. 1125	*	*	*	*	*	*	—	—	—	*	*	—
,, French, p. 1126	—	—	—	*	*	*	*	—	—	—	—	—
,, Runner, p. 1127	—	—	—	*	*	*	*	—	—	—	—	—
Beetroot, p. 1151	—	—	*	*	*	—	—	—	—	—	—	—
Borecole or **Kale,** p. 1116	—	—	*	*	*	*	—	—	—	—	—	—
Broccoli, p. 1116	—	—	*	*	*	*	—	—	—	—	—	—
,, Sprouting, p. 1117	—	—	*	*	—	—	—	—	—	—	—	—
Brussels Sprouts, p. 1115	—	—	*	*	*	—	—	—	—	—	—	—
Cabbage, p. 1114	—	*	*	—	—	—	*	*	*	*	—	—
Cardoon, p. 1142	—	—	—	*	—	—	—	—	—	—	—	—
Carrot, p. 1128	*	*	*	*	*	*	—	—	—	—	—	—
Cauliflower, p. 1117	—	—	*	*	*	—	—	*	*	—	—	—
Celeriac, p. 1132	—	—	—	*	*	—	—	—	—	—	—	—
Celery, p. 1130	—	—	—	*	*	*	—	—	—	—	—	—
Chicory, p. 1144	—	—	—	*	*	—	—	—	—	—	—	—
Chives, p. 1161	—	—	*	—	—	—	—	—	—	—	—	—
Colewort, p. 1115	—	—	—	—	*	*	—	—	—	—	—	—

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Corn Salad, p. 1161	—	*	*	—	—	—	—	*	—	—	—	—
Cucumber, p. 1156	—	*	*	—	—	—	—	—	—	—	—	—
Endive, p. 1143	—	—	—	—	*	*	*	*	—	—	—	-
Garlic, p. 1151	—	*	*	—	—	—	—	—	—	—	—	—
Good King Henry, p. 1153	—	—	—	*	*	—	—	—	—	—	—	—
Horseradish, p. 1162	*	*	—	—	—	—	—	—	—	—	—	—
Kohl Rabi, p. 1118	—	—	*	*	*	*	—	—	—	—	—	—
Leek, p. 1150	—	—	*	—	—	—	—	—	—	—	—	—
Lettuce, p. 1142	—	*	*	*	*	*	*	*	—	—	—	—
Melon, p. 1158	—	*	*	—	—	—	—	—	—	—	—	—
Onion, p. 1148	—	*	*	—	—	—	*	*	—	—	—	—
Parsley, p. 1132	—	—	*	*	*	—	—	*	—	—	—	—
Parsnip, p. 1129	—	*	*	—	—	—	—	—	—	—	—	—
Pea, p. 1128	—	*	*	*	*	*	*	—	—	—	*	—
Potato, p. 1133	—	*	*	*	—	—	—	—	—	—	—	—
Radish, p. 1120	*	*	*	*	*	*	*	*	—	—	—	—
Rhubarb, p. 1154	—	*	—	—	—	—	—	—	*	—	—	—
Salsafy, p. 1145	—	—	*	*	*	—	—	—	—	—	—	—
Savoy, p. 1115	—	—	*	*	*	—	—	—	—	—	—	—
Scorzonera, p. 1145	—	—	*	*	*	—	—	—	—	—	—	—
Sea Kale, p. 1121	—	—	*	—	—	—	—	—	—	—	—	—
Shallot, p. 1151	—	*	*	—	—	—	—	—	—	—	—	—
Spinach, p. 1152	—	*	*	*	*	*	*	*	—	—	—	—
,, N. Zealand, p. 1154	—	—	—	*	*	—	—	—	—	—	—	—
Tomato, p. 1137	—	—	—	—	*	*	—	—	—	—	—	—
Turnip, p. 1119	—	*	*	*	*	*	*	—	—	—	—	—
Vegetable Marrow, p. 1155	—	—	—	—	*	*	—	—	—	—	—	—
Total for each month	4	19	33	29	28	17	10	9	3	2	2	—

VEGETABLES

JANUARY

Cabbage (p. 1114).—In mild open weather any young plants on hand in frames or sheltered spots may be transplanted to the open.

Carrots (p. 1128).—Seeds of the *Horn* varieties may be sown in a gentle hotbed. At the end of the month seeds may be sown out of doors on a warm south border.

Cauliflowers (p. 1117).—Seeds may be sown in a gentle hotbed.

Digging and trenching (p. 63).—These operations may be carried out where required as advised at p. 64, and the soil should be prepared for reception of cro

Horse-radish (p. 1162).—This may be planted in mild weather to secure a good growth during the year.

Lettuce (p. 1142).—Seeds may be sown in boxes or gentle hotbeds for planting out later on in favourable weather.

Manuring (p. 70).—Manure may be wheeled on to the ground where wanted.

Mushroom Beds (p. 1166).—Make up and spawn when ready.

Onions (p. 1148).—Seeds of a good variety like *Ailsa Craig* may be sown in a gentle hotbed. The seedlings may afterwards be pricked off and kept near the glass with plenty of air when established. About the middle of April transplant to the open ground about 6 in. apart in rows a foot apart. The stored bulbs may be overhauled, and any sprouts should be checked by breaking off or touching with a hot iron.

Peas (p. 1123) and **Broad Beans** (p. 1125).—Towards the end of the month seeds may be sown on warm borders.

Potatoes (p. 1133).—The 'sets' or tubers may be placed in shallow boxes and exposed to the light to start the crown growths. About the end of the month they may be planted in a frame as advised at p. 1134, and a few drills may also be placed outside in a warm and sheltered south border.

Radishes (p. 1120).—Seeds may be sown in a gentle hotbed, and out of doors at the end of the month on a warm south border. They should be covered in the latter case with litter, but this should be lifted on all bright warm days after the seeds are up.

FEBRUARY

Beans, Broad (p. 1125).—Another sowing may be made in mild weather and in sheltered places.

Beans, French (p. 1126).—Seeds may be sown in pots or boxes in warm frames.

Brussels Sprouts (p. 1115).—Seeds may be thinly sown in boxes on a gentle hotbed or even cold frame, so as to obtain early plants for the outside.

Cabbage (p. 1114).—Seeds may be sown in frames or boxes for planting out in favourable weather. Sutton's *Earliest of All* is a good Cabbage for this purpose and will succeed the ordinary spring Cabbages. *Savoys* (p. 1115) may also be sown in the same way.

Carrots (p. 1128).—Seeds of *Early French Horn* may be sown in the open border in warm sheltered spots.

Celery (p. 1130).—Seeds may be sown in boxes in gentle heat for early planting.

Corn Salad (p. 1161).—Sow seeds in rows or drills about 6 in. apart and keep free from weeds.

Cucumbers (p. 1156). — Prepare hotbeds as described at p. 46, and allow rank steam to escape before planting. Seeds should be sown early in the month in heat.

Garlic (p. 1151).—The bulbs may be planted about the middle of the month, but not later than the end of March.

Globe Artichokes (p. 1141).—The litter which had been placed over these for protection may be removed in the event of mild weather.

Horse-radish (p. 1162). — This may be planted in mild weather if not already done in January.

Jerusalem Artichokes (p. 1140).—Tubers may be planted now, and also next month.

Leeks (p. 1150). —A few seeds may be sown in gentle heat in boxes. The seedlings should be kept near the glass, and may be planted out later on in mild weather.

Lettuce (p. 1142).—Seeds of Cabbage Lettuces may be sown in frames, and on sunny borders at the end of the month.

Melons (p. 1158).—Prepare hotbeds and sow seeds early in the month.

Onions (p. 1148).—Seeds for the main crop may be sown about the end of the month and also in March.

Parsley (p. 1132).—Along the edges of the fruit borders and kitchen garden, seeds may be sown.

Parsnips (p. 1129).—Seeds may be sown out of doors about the end of the month in warm spots.

Peas (p. 1123).—Plants will now be well above ground from seed sown in autumn, and should have the soil drawn up to them for protection from frost. They should also be staked for a similar reason. About the middle of the month a few rows of early varieties like *William I.* and *Gradus* may be sown outside.

Potatoes (p. 1133).—Early kinds like *Rivers Ashleaf* may be planted on a south border. The tubers for planting out later should be overhauled and placed in shallow boxes in preparation. Those in frames should be earthed up when necessary.

Radishes (p. 1120).—Seeds may be sown out of doors in warm borders.

Rhubarb (p. 1154).—Old clumps may be divided. Each portion should have a good bud or two and be planted in rich soil. It is best not to pick from the new bed until the following season.

Sea Kale (p. 1121).—The crowns may be covered with ashes to a depth of about 6 in. so that the pushing growths will be blanched; or the crowns may be covered with pots around which a thick layer of decaying leaves may be placed.

Shallots (p. 1151).—The bulbs may be planted about the middle of the month in rows about a foot apart in rich soil. The bulbs should be about 6–9 in. apart in the rows.

Spinach (p. 1152).—Seeds may be sown in rows or beds, or between the rows of Peas at the very end of the month if the weather be fine.

Turnip (p. 1119).—A small sowing of *Snowball* may be made on a warm border. The 'tops' (leaves) of last year's plants may be picked for use if ready.

MARCH

Asparagus (p. 1145).—Roots may be transplanted in mild weather. By placing movable lights over old beds stalks will be ready for cutting about the end of April. New beds may be made this month.

Beans, Broad (p. 1125).—Seeds of *Broad Windsor*, *Long Pod*, and other varieties may be sown about the first or second week and will often be quite as forward as those of *Early Mazagan* sown in November.

Beetroot (p. 1151).—Sow seeds during the month.

Brussels Sprouts (p. 1115).—Sow seeds on warm border.

Cabbage (p. 1114).—Seeds may be sown in frames or on a south border according to the season and locality.

Cardoons (p. 1142).—Seeds may be sown in pots.

Carrots (p. 1128).—Seeds of *Early Nantes* may be sown as a succession crop to *Early Horn*. Thin out when the plants begin to get too thick.

Cauliflowers (p. 1117).— Plants raised in frames may be planted out in trenches in sheltered parts of the garden, and covered with handlights at night for a week or two.

Celeriac (p. 1132).—Sow seeds under glass.

Celery (p. 1130).—Seeds for the main crop may be sown in cold frames. The seedlings from earlier sown seeds may be planted in frames.

Chives (p. 1161).—Old clumps may be divided and replanted in fresh places in good soil.

Clearing up.—All exhausted greens from the autumn and winter should be cleared off the ground and burnt.

Corn Salad (p. 1161).—Sow seeds in drills or narrow beds for summer use.

Cucumber (p. 1156).—Sow seeds of Ridge varieties for planting out in June, and plant seedlings of indoor varieties in hotbeds already prepared.

Herbs. — The various kinds described at p. 1160 may be attended to in the matter of division and rearranging for the summer months.

Kohl Rabi (p. 1118).—Seeds may be sown at the end of the month.

Leeks (p. 1150).—Sow seeds rather thickly in the open border in rich soil. When fit for thinning out transplant the thinnings.

Lettuce (p. 1142).—Tie up plants grown in frames for blanching, and make sowings outside, in deep rich soil.

Mushrooms (p. 1166).—Beds may be prepared out of doors.

New Zealand Spinach (p. 1154).— Seeds may be sown in pots or boxes to supply plants for the open air.

Onion (p. 1148).—Sow seeds in rows about the end of the month.

Parsnip (p. 1129).—Sow seeds of the *Student* Parsnip for main crop about the end of the month in deeply dug soil.

Peas (p. 1123).—Seeds of the early kinds may be sown at intervals of a fortnight during the month, and any raised in frames earlier may be planted out.

Potatoes (p. 1133).—Prepare the ground by digging, or levelling down if ridged up in winter, and plant from the middle of the month onwards until finished for main crops. In late districts where frosts occur in May, planting may be deferred until April.

Radishes (p. 1120).—Sow *French Breakfast* varieties.

Rhubarb (p. 1154).—Any 'stools' that have been forced may be divided and replanted.

Salsafy (p. 1145).—Sow seeds in rows about a foot apart, and only lightly cover the seeds.

Savoys (p. 1115).—Sow seeds in the open.

Sea Kale (p. 1121).—Plant the roots or thongs to produce crowns for forcing next season. The thin roots about the thickness of a lead pencil are best.

Spinach (p. 1152).—Sow again between Peas or in sheltered beds.

Tomatoes (p. 1137).—Seeds may be sown in gentle heat for planting out in May or June.

Turnips (p. 1119).—Sow small patch with seeds of *Early Milan* towards end of month.

Vegetable Marrow (p. 1155).—Seeds may be sown about the end of the month in gentle heat.

Winter Greens.—Seeds of Broccoli and Kale may be sown about the middle of the month, and again at the end, to supply greenstuff in winter.

APRIL

Artichoke, Globe (p. 1141).—Suckers from the base of old plants may now be detached and planted in deep and well-prepared soil in rows about 4½ ft. apart, the suckers being about 2 ft. apart in the rows, or nearer as recommended.

Beans, Broad (p. 1125).—Sow again.

Beans, French (p. 1126). — Plants raised under glass or in frames may be planted out in mild weather on south border. Seeds may be sown in the open ground from the middle of the month.

Beans, Scarlet Runner (p. 1127). — Sow seeds in boxes under glass or in frames for planting out later on.

Beetroot (p. 1151). — Sow seeds of *Dell's Crimson*, and *Long Beet* for main crop.

Broccoli (p. 1116).—Any time from the beginning to the middle of the month a sowing may be made of *Walcheren*, *Veitch's Autumn Self-Protecting*, or *Mammoth White*, for planting out about the middle of June.

Brussels Sprouts (p. 1115).—These will now require pricking out 4–6 in. apart to make strong sturdy plants, and another sowing may be made early in the month if necessary.

Carrot (p. 1128).—Sow seeds of *James's Scarlet Intermediate*, and thin out earlier crops. Those in frames will be ready for use at the end of the month.

Cauliflowers (p. 1117).—Plant out again in trenches, and make a sowing of *Walcheren* for late summer and autumn use.

Celery (p. 1130).—Prepare trenches for the first crop, and plant the intervening spaces or ridges with Lettuce.

Chicory (p. 1144).—Sow seeds to produce plants for forcing or blanching.

Cucumbers (p. 1156).—Sow seeds of Ridge varieties for planting in the open air.

Hoeing.—Weeds will now be springing up in abundance and should be checked by hoeing.

Kohl Rabi (p. 1118).—A small sowing may be made in shallow drills 12–18 in. apart, at the beginning of the month or later.

Leek (p. 1150).—Plant out seedlings raised under glass at the end of the month.

Lettuce (p. 1142).—Sow seeds of Cos and Cabbage varieties, and prick out or transplant from earlier sowings between Celery trenches or other suitable places.

Melons (p. 1158).—Plant in hotbed.

Mustard and Cress (p. 1164).—Sow in cold frames the first part of month, but in the open air afterwards.

New Zealand Spinach (p. 1154).—Seeds may be sown out of doors.

Parsnip (p. 1129).—Thin out seedlings, but do not transplant thinnings, as the broken tap-root will only become fanged.

Peas (p. 1123).—Sow *Ne Plus Ultra* and other good sorts at intervals of a fortnight during the month.

Potatoes (p. 1133).—Kinds grown in frames will be fit to dig this month. Those outside will show about the end of the month and should have soil drawn up to them for protection against May frosts. All planting should be finished this month.

Radishes (p. 1120).—Make a sowing about once a fortnight for succession.

Spinach (p. 1152).—Sow seeds of *Victoria* Spinach.

Spinach Beet (p. 1152).—Sow seeds if required.

Turnips (p. 1119).—Hoe and thin out, and make a larger sowing than in March. *Snowball* is a good variety.

Winter Greens.—Sow more seeds of Broccoli, Savoys, and Kale.

MAY

Asparagus (p. 1145).—Attend to cutting, but do not strip plants too heavily.

Beans, Broad (p. 1125).—Sow for late crop and draw earth up round the stems of plants already up.

Beans, Scarlet Runner (p. 1127).—Sow in the open, and plant out any raised in boxes.

Beans, French (p. 1126).—Sow in the open. *Canadian Wonder* is a good sort.

Beetroot (p. 1151).—Thin out 6–9 inches apart and make a good sowing about the middle of the month.

Broccoli (p. 1116).—The most advanced seedlings from the sowing made in April may be pricked out about 6 in. apart to become sturdy, and ready for transplanting from the middle to the end of June.

Brussels Sprouts (p. 1115).—Plant out about 3 ft. apart each way in good soil.

Cabbage (p. 1114).—Plant out in dull showery weather.

Cardoon (p. 1142).—Sow seeds in the open ground as advised.

Carrots (p. 1128).—A sowing may be made for winter use.

Cauliflower (p. 1117).—Plant out *Autumn Giant* about the end of the month.

Celeriac (p. 1132).—Plant out sturdy seedlings, and at the same time trim the root and leaves.

Celery (p. 1130).—Prepare more trenches if necessary and plant ridges with Lettuce.

Endive (p. 1143).—Make a sowing at the end of the month.

Kohl Rabi (p. 1118).—Thin out seedlings about a foot apart.

Lettuce (p. 1142).—Tie up any heads fit for blanching. Thin out seedlings and make another sowing.

Onions (p. 1148).—Young plants may be dusted with soot to prevent attacks of pests. Thin out 4–6 in. apart. The thinnings may be used for salads.

Parsley (p. 1132).—Thin out 4–6 in. apart.

Peas (p. 1123).—Attend to staking, and make a sowing of Marrowfat varieties.

Potatoes (p. 1133).—Earth up early kinds where necessary and give a light dressing of nitrate of soda or sulphate of ammonia (see p. 71).

Radishes (p. 1120).—Make a sowing of *French Breakfast* kinds about once a fortnight.

Weeding.—The hoe should be kept going regularly to keep down annual weeds and assist the growth of the various crops.

JUNE

Asparagus (p. 1145).—Finish cutting by the middle of the month, and give the beds a good top dressing of manure.

Beans, French (p. 1127).—Make a sowing of *Canadian Wonder.*

Beans, Broad (p. 1125).—The last sowing for the year may be made about the middle of the month. Pinch out tops of earlier crops and give plenty of water or liquid manure if necessary.

Broccoli (p. 1116).—From the middle to the end of this month the seedlings sown in April, and pricked out in May, may be planted out 2–3 ft. apart each way.

Brussels Sprouts (p. 1115).—Plant out.

Carrots (p. 1128).—About the end of the month sow *Early Horn* for winter use.

Cauliflowers (p. 1117).—The leaves of those plants making nice heads may be tied over or cracked to give protection. Plenty of water should be given in dry weather.

Celery (p. 1130).—Plant in trenches, with Lettuce on ridges, and dust with lime and soot. Give plenty of water.

Coleworts (p. 1115).—A sowing may be made about the middle of the month for use in autumn.

Cucumbers (p. 1156). — Plant out Ridge varieties in favourable weather.

Leeks (p. 1150). — Plant out in shallow trenches which have been previously dug and manured.

Lettuce (p. 1142).—Tie up heads ready for blanching. Make another sowing at end of month.

Onions (p. 1148).—Hoe between the rows to keep weeds down and prevent attacks of insect pests.

Parsley (p. 1132).—Sow for winter use about the end of month.

Peas (p. 1123).—Make further sowings, and mulch plants with decayed manure.

Potatoes (p. 1133).—Fork up the soil between the rows, and earth up later on. Early varieties from south borders will be ready for digging by the end of the month.

Rhubarb (p. 1154).—Remove flower spikes as they appear.

Sea Kale (p. 1121).—Remove flower spikes as they appear.

Tomatoes (p. 1137).—Plant out at the foot of south walls and fences.

Turnips (p. 1119).—Make a sowing on a cool border, and thin out earlier sowings. Dust with lime and soot in showery weather to check Turnip Fly.

Vegetable Marrows (p. 1155).—Plant out at the beginning of the month, and protect with boxes or handlights at night time for a week or so until the roots take a hold of the soil.

Winter Greens.—Prick out from seed beds Broccoli and Kale, to get strong.

JULY

Beans, French (p. 1126).—A sowing may be made on south border after Potatoes have been dug. Give plenty of water in dry weather, or Red Spider will appear.

Cabbage (p. 1114).—For a spring crop, seeds may be sown about the middle of the month; *Ellam's Early*, *Enfield Market*, and *Sutton's Flower of Spring* are good varieties for sowing at this season. Plants from the March and April sowing may be planted out on prepared ground recently occupied by early Potatoes or Onions.

Cauliflowers (p. 1117).—Plant out for late crop, and tie leaves over heads becoming fit for use. Give plenty of water with occasional doses of liquid manure.

Celeriac (p. 1132).—Draw earth up to the plants.

Celery (p. 1130).—The earliest crop may receive a good soaking with liquid manure, and afterwards have a little soil drawn up every week towards the plants from the ridges. Plant out late crops about third or fourth week. Dust lime and soot over the plants as a check to the Celery Fly.

Coleworts (p. 1115).—Plant out about the middle of the month.

Endive (p. 1143).—Make another sowing early in the month. Thin out earlier sowings, and transplant the thinnings.

Herbs (p. 1160).—Cut for drying.

Leeks (p. 1150).—Earth up and water well, with occasional doses of liquid manure.

Lettuce (p. 1142).—Sow seeds of *Brown Cos*, *Tom Thumb*, and *All the Year round Cabbage* varieties.

Mulching (p. 69).—Standing crops may be mulched with old cow-manure to prevent evaporation. The use of the hoe between the plants will also be beneficial.

Parsley (p. 1132).—Thin out last sowing.

Peas (p. 1123).—For a late crop seeds of early varieties may be sown the first or second week.

Savoys (p. 1115). — Plant out about the middle of the month and again later if ground can be spared.

Spinach (p. 1152).—Make a sowing for a winter crop about the end of month.

Turnips (p. 1119).—Hoe and thin out.

Vacant Ground.—All vacant ground should be dug, manured if necessary, and prepared for other crops.

Vegetable Marrows (p. 1155). — Give the plants a good mulch with well-decayed manure and peg out the main shoots. Cut fruits before they get too old.

AUGUST

Beans, French (p. 1126).—Sow in frames for late use.

Broccoli (p. 1116).—Finish planting out from the seed beds.

Cabbages (p. 1114).—In the south seeds for spring crops may be sown up to about the middle of the month. Red Cabbage may be sown at same time.

Cauliflowers (p. 1117).—Sow seeds about the second or third week of *Early Erfurt*, *Walcheren*, and *Autumn Giant* varieties.

Celery (p. 1130).—Earth up and water as required.

Endive (p. 1143).—Plant out.

Hoeing.—The hoe may be used constantly to keep weeds down and to stir the soil

Onions (p. 1148).—Early in the month, if not the last week in July, make a sowing of *White Spanish*, *White Tripoli*, or *Lisbon* for use next spring and summer.

Peas (p. 1123).—Mulch and water late crops.

Potatoes (p. 1133).—The second early crops will be ready for digging by the middle of the month, and the ground occupied by them may be planted with Cos Lettuce, Green Curled Endive, Savoys, and Turnips.

Radishes (p. 1120).—Seeds may be sown on moist shady border or bed.

Spinach (p. 1152).—Sow for winter crop up to about the third or fourth week.

Tomatoes (p. 1137). — Keep side shoots pinched out, and thin the lower leaves and any others preventing sunshine getting to the fruits.

SEPTEMBER

Broccoli (p. 1116).—The soil may receive a light dressing of nitrate of soda or sulphate of ammonia, preparatory to being stirred with the hoe.

Cabbage (p. 1114).—Plant out kinds sown in July and August on ground previously occupied by Onions or Potatoes.

Corn Salad (p. 1161).—Sow seeds in warm places.

Lettuce (p. 1142).—Seeds of Cos varieties may be sown on a warm border during the month to plant out in spring. Tie up heads fit for blanching and plant out seedlings.

Mint (p. 1164).—The tops of old plants may be cut down.

Mushrooms (p. 1166). — Manure for beds should be prepared and turned over.

Mustard and Cress (p. 1164).—Seeds may be sown about twice a week in shady spots.

Onions (p. 1148).—To assist bulbs to ripen the leaves may be twisted.

Potatoes (p. 1133).—Dig all kinds when the stalks and leaves begin to wither. Store the tubers away carefully.

OCTOBER

Asparagus (p. 1145).—Cut down all brown stalks and dress the bed with about 6 in. of well-rotted manure.

Beetroot (p. 1151).—The roots may be lifted and stored after twisting (not cutting) the leaves off.

Cabbages (p. 1114).—Plant out *Ellam's Dwarf Early* and *Enfield Market* for spring and early summer crops. They may occupy ground from which Potatoes, Beans, or Onions have been taken.

Carrots (p. 1128).—The roots may be lifted and stored in soil.

Cauliflowers (p. 1117).—Young plants may be pricked into frames and the leaves tied over the heads of those nearly ready for use. Other plants may be lifted with a good ball of soil and planted in deep frames so as to be safe from frost.

Celery (p. 1130).—Earth up as required on dry days.

Horse-radish (p. 1162).—The roots for use may be lifted and stored in soil under a north wall.

Leeks (p. 1150).—Earth up when necessary.

Lettuce (p. 1142).—Plant out in warm borders, and also in frames.

Onions (p. 1148).—Lift in dry weather and leave exposed to the air for a few days Afterwards store.

Tomatoes (p. 1137).—By the end of the month all the fruits will be finished and the plants may be taken up and burned. If allowed to rot they may generate the dreaded Tomato disease for next season.

NOVEMBER

Beans, Broad (p. 1125).—Seeds of *Early Masagan* may be sown in warm sunny positions, but it is questionable if there is anything gained by doing so.

Broccoli (p. 1116).—Plants of the late crops should be heeled in.

Peas (p. 1123).—The first sowing may be made in light and well-drained soil on a warm sunny border during this month. It is, however, waste of time to sow on cold heavy soils at this period.

Trenching (p. 65).—This should be done where necessary.

DECEMBER

Cabbages (p. 1114).—The soil may be drawn up to the plants as a little protection and also for drainage.

Leeks (p. 1150).—Draw the earth up round the stems.

Lettuces (p. 1142).—Vacant frames may be filled with plants from the border.

Potatoes (p. 1133).—About the second or third week a few 'sets' of tubers may be placed in shallow boxes to sprout, previous to planting in frames.

Group I.—Cruciferous Crops

Diseases of Cruciferous Crops.—Many plants, both wild and cultivated, belonging to the Crucifer Order (see p. 201) are subject to a virulent disease known as 'Clubroot' or 'Fingers and Toes.' Turnips especially, and Cabbages, suffer most severely from this disease, but other kinds suffer from it also. It is caused by a fungus called *Plasmodiophora brassicæ*, which penetrates the roots and causes them to swell up abnormally into a roundish or spindle-shaped mass, often more or less spreading like fingers, hence one of the common names. The root cells are very much swollen by the action of the fungus, and when first attacked their contents are of a slimy yellowish colour. During the autumn and winter months the fungus is maturing, and by the spring its numerous spores' contents are shed, and creep about the damp soil by means of motile hairs. In due course each one completely unites or fuses with some other and forms a larger body. In this state they are ripe for vegetating on the roots of any Cruciferous plant, whether weeds or not, and set up the disease in them.

Remedies.—It is often a good plan to dig the green stems and leaves of plants into the soil as a manure, especially plants belonging to the Pea and Bean Order (Leguminosæ, see p. 822). That practice, however, cannot be recommended with any plants of the Cabbage family (Cruciferæ, see p. 201) owing to the above disease. It is therefore a mistake to allow the stumps and roots of Cabbages, Brussels Sprouts, Broccoli and the other crops described from p. 1114 to p. 1123 to lie rotting on the soil, or to dig them in as manure, as they may contain the germs of the disease. They are best burned, and there will be no danger in spreading the ashes over the soil. This may be regarded more as a preventive perhaps than as an actual remedy, but burning will effectively destroy any Clubroot fungus that may be in the roots.

A second remedy or preventive consists in the rotation of crops (p. 1104). Never grow plants of the Cabbage family on the same ground two years running if it can possibly be avoided, even if Clubroot does not exist. Where Clubroot has appeared once, Cruciferous crops should not be grown for years, and all Cruciferous weeds like Charlock or Wild Mustard, Shepherd's Purse, Garlic Mustard &c. should be stamped out, as their roots serve as more or less welcome hosts for the fungus. Treatment with lime, soot &c. is very little use against the disease, although they benefit the soil, but boiling water would probably be highly effective.

Anbury or *Ambury* is another disease common to Cruciferous plants, especially Turnips and Cabbages. It is brought about by small Cabbage Gall Weevils called *Ceutorrhynchus sulicollis* which form galls on the roots. These galls harbour the small white grubs of the Weevil, and become as large as split peas. Little mischief seems to result from their attacks, but whenever galled roots are noticeable they should be picked off and burned so as to destroy the grubs. When transplanting Cabbages, Brussels Sprouts &c. some gardeners dip the roots into a lather or puddle of clay and soot and lime as a preventive. The remedies mentioned above under Clubroot are on the whole the safest and best.

Other pests of Cruciferous crops, besides those already mentioned under Turnip (p. 1119), are the whitish cylindrical maggots of the Cabbage Fly (*Anthomyia brassicæ*). These attack both stem and root and cause the leaves to 'flag' or wilt and turn yellow. The infested plants are best removed and burned. At the time of planting, a good dressing of lime and soot around the young plants will check their ravages.

The Large White Cabbage Caterpillar (*Pieris brassicæ*), and the Small White one (*P. rapæ*), and the caterpillars of the Cabbage Moth (*Mamestra brassicæ*) do a good deal of mischief to the leaves and heads of Cabbages &c., often spoiling a whole crop when measures are not taken to prevent them.

Hand-picking and treading under foot is an effective but tedious cure. A good sprinkling with lime and soot early in the morning when the plants are wet with dew will be found useful. Soapy water is also a good remedy. See also Enemies &c. of the Turnip (p. 1120).

CABBAGE (Brassica oleracea capitata). — The progenitor of the cultivated Cabbage is still found wild in many parts of England near the seashore, but, needless perhaps to say, it bears no resemblance to any of its descendants. As a vegetable the Cabbage is very highly esteemed, and by selection of good early and late varieties may be had in use nearly the whole year round.

Soil.—The soil for Cabbages should be well dug or trenched, receiving at the same time a good dressing of well-decomposed manure, which should, however, be well buried in the trenches or furrows, so as to be at least 9 inches beneath the surface. Any good garden soil will suit Cabbages, but they prefer a good rich and deep loam on a chalky subsoil. Hot dry soils are of little use for growing Cabbages, and cool moist situations should be chosen if possible. When the young plants have become established they require little attention beyond drawing the soil up to the stems from each side, and keeping the weeds down by hoeing occasionally. In the event of dry weather at the time of planting it is best to give each plant a good watering.

Spring Cabbages. — To obtain Cabbages in spring and early summer it is necessary to sow the seeds from about the middle to the end of August in the north, and about a fortnight later in the south. If sown out of doors earlier or later than these periods, the plants are apt to 'bolt' or run to seed in spring, and therefore valueless as a crop. The seeds may be sown thinly on specially prepared beds or in shallow drills or rows, afterwards raking the soil over and gently patting it down with the back of the spade. Two good varieties for sowing at this period are *Ellam's Dwarf Early* and *Enfield Market.* As a rule it is a good plan to give the seed bed a good watering. By the end of September or beginning of October the young plants will be large enough to transplant in rows or drills, allowing 1½–2 ft. between the plants every way. Some gardeners, however, have the plants at first 15 in. apart in the rows, which should be about 2 ft. apart, and in early spring every other plant is cut and used as 'greens.' This is an excellent practice, especially in severe winters when the supply of 'greens' in early spring is likely to be scarce. By cutting every other plant a distance of 2½ ft. is then left between the plants in the rows, and this allows plenty of space to enable the remaining plants to develop for the main crop. Dull and mild showery weather is the best for transplanting.

Autumn Cabbages.—For autumn and winter use the seed should be sown in March and April in shallow drills or rows, as mentioned above. When the seedlings are large enough to handle (with 3-4 leaves), that is, in June and July, they are transplanted in the same way to their permanent quarters, and will be ready for use from August to October. This crop of Cabbages may very fitly be grown on soil that has already grown a crop of Onions or early Potatoes.

Successional Sowings. — The above are the two seasons of sowing seeds for the two principal crops. But Cabbages may be sown earlier and later than the dates mentioned in each case, so as to produce earlier or later crops. Thus in February seeds may be sown in a warm pit or frame, and the seedlings pricked out into nice light soil in similar places, giving them, however, as much air and light as possible, so long as they are not frosted. When they become rather thick, and according to the mildness of the weather, the young plants may be transferred to the open ground, the lifting and planting being done as carefully as possible so as not to give too great a check to the roots. These plants will be ready for cutting in summer, and may have a crop of Lettuce taken off the ground between the rows while growing.

Cutting Cabbages. — When fully developed with a full round and hard centre or 'heart' Cabbages are fit for cutting. To make the supply last as long as possible the heads should be cut at the top of the stem to which a few of the lower leaves may be left attached. If the stems are thus allowed to remain they will develop numerous 'sprouts' up the stem in due course, and these are also much appreciated. To secure the best results the sprouts should be thinned out somewhat, otherwise the stems will be clustered with a mass of small heads of inferior value.

VARIETIES OF CABBAGE

There are several kinds of Cabbages, but the best for general purposes are *Early Rainham*, *Ellam's Dwarf*

Early Spring, *Enfield Market*, and *Wheeler's Imperial*. These are all excellent Cabbages, but to obtain the best results from *Ellam's Dwarf Early*, the seeds must be sown in July or August. A variety called *Chou de Burghley*, or *Gilbert's Cabbage Broccoli*, produces hearts like those of Broccoli if allowed to remain on the ground long enough. It is highly appreciated by some, but not by others. It should be cut while in the form of a Cabbage, before the Broccoli head develops, and is very useful if sown in May, when it will come into use the following February.

Pickling Cabbage. — For pickling purposes the variety known as *Red Dutch* is the best. Seeds may be sown in either March or July according to the time the plants are wanted, but the July sowing is usually considered to yield the best results. The seedlings should be about 3 ft. apart in the rows. As Red Cabbages take about 14 months to produce large and solid heads, they should be grown on rich soil. To make the best use of the latter it may be utilised in the meantime to mature a crop of Potatoes, spring or autumn Cabbages, Lettuces, &c., but the rows should then be correspondingly wide for the Red Cabbage, say 3½–4 ft.

Coleworts or **Collards.** — These are really small-headed and very useful Cabbages, known in gardens as 'Greens' during winter and early spring when they have not formed proper heads. They are most appreciated in winter, and to obtain them at this period seeds are sown about the middle of June. The seedlings are treated in the same way as Cabbages, but as they produce smaller heads, a foot or so between the plants is quite sufficient space to allow them. If seeds are sown in April and May, afterwards transplanting the seedlings in showery weather, the plants will turn in by early autumn with nice heads, and thus succeed the summer Cabbages and when Peas are becoming scarce. The variety known as the *London* or *Rosette Colewort* is the one usually grown. It forms small compact heads and cooks tenderly.

For diseases &c. see p. 1118.

Couve Tronchuda or **Portugal Cabbage.**—This is a Portuguese variety, the leaves of which have thick white fleshy midribs, but they do not form very compact heads. The leaves are very tender when cooked, but require to be slightly frosted like Savoys in order to develop the flavour to its fullest extent. A variety known as the *Dwarf Portugal Cabbage* forms denser and more compact heads than the ordinary variety.

SAVOY CABBAGE (BRASSICA OLERACEA BULLATA). — Although resembling the Cabbage in general appearance, the Savoy is more nearly related botanically to Brussels Sprouts. It is readily recognised by the large leaves, which have a very wrinkled or 'bullate' surface. The Savoy is very highly appreciated in some gardens, as it grows so easily and requires very little attention. Its cultivation is the same as for the Cabbages described above, with the exception that as a rule seeds are only sown out of doors in spring, at intervals from March to May, to secure a good succession. The young plants should be placed 1½–2 ft. apart, according to the variety grown. The *Drumhead Savoy*, which is the largest variety grown, and is excellent for the general crop, though rather coarse, should be 2 feet apart, while the *Early Dwarf Ulm* and *Tom Thumb* may be about 18 in. apart. All the kinds are very hardy and stand frost well; indeed they are considered all the better for having been frosted, and this fact renders Savoys valuable, especially when ordinary Cabbages are scarce.

BRUSSELS SPROUTS (BRASSICA OLERACEA BULLATA GEMMIFERA). — This highly esteemed vegetable derives its name from the fact that it was originally introduced from the gardens round Brussels, where it has been grown for five or six centuries. Although the general treatment is the same as for the Cabbage, the soil need not be so rich or so heavily manured. If too rich there is a tendency on the part of the plants to produce rather loose sprouts, instead of roundish compact ones. The character of the plant is well known, the stem being studded with spiral rows of roundish heads or 'sprouts,' and ending with a rosette of wrinkled leaves forming a kind of spreading umbrella.

Time of sowing. — Seeds may be sown in March in frames, afterwards in the open air at the end of March and early in April, and finally the first week in May so as to secure a good succession. For all ordinary purposes, however, one large sowing at the end of March or early in April is usually sufficient when a succession is not of great importance.

The seedlings having made 3–4 leaves are duly transferred to the open ground. They may be 1½–2 ft. apart in the rows, the latter being 2–3 ft. apart. Or where ground is scarce they may be intercropped with Potatoes, allowing two rows of the latter to every one of Brussels Sprouts, unless the rows are particularly wide apart. The general cultivation afterwards is the same as for Cabbage (see p. 1114). A week or two before the sprouts are ready to be picked, some of the spreading leaves from the top may be removed and used as greens, but it is scarcely advisable to cut off the whole head as sometimes recommended. The sap the detached leaves would otherwise absorb is thus drafted into the sprouts on the stem and enables them to become plumper and better matured. During dry seasons the plants will be greatly benefited by copious waterings towards evening. Frequent stirring of the surface of the soil between the rows with a hoe will also act as a mulching and prevent a good deal of moisture being evaporated. Among the most useful varieties to grow are *Aigburth* (or *Otterspool Improved*), a fine form with large sprouts; *Dalkeith*; *Scrymger's Giant*, one of the best; *President Carnot*; and *The Wroxton*, the latter being very fine.

For diseases &c. see p. 1113.

BORECOLE or **KALE** (BRASSICA OLERACEA ACEPHALA or FIMBRIATA).—This excellent vegetable is very hardy and is often found most useful in severe winters when Cabbages and other greenstuff are utter failures. All Kales are improved in flavour by the action of light frosts.

It succeeds in an ordinary good garden soil, but enjoys a well dug and manured loam as recommended for Cabbages (p. 1114).

Time of sowing.—As a rule seeds of Borecoles may be sown for the main crop in March and April, but an earlier sowing may be made in a cold frame if required. Seeds may also be sown as late as the middle of May in the south, and the beginning in the north, where a good succession of plants is required.

When the seedlings are strong and sturdy without being allowed to grow long and lanky in the seed beds, they may be planted in drills at a distance of about 2 ft. apart every way. *Cottager's Kale*, being a vigorous growing plant, may be planted about 2½ ft. apart each way.

The general cultivation after planting is the same as for Cabbages (see p. 1114). By keeping the hoe in frequent use between the rows the soil is kept in good condition, and the loosened surface acts as a mulch during the summer months.

Among the best varieties grown are the *Asparagus* or *Buda Kale*. *Cottager's Kale* is very hardy and well worth growing. The *Dwarf Green Curled* or *Scotch Kale* is excellent for winter and spring use, while the *Hearting* or *Cabbaging Kale* produces close compact heads, but is not so hardy as the other varieties. The variegated forms are very handsome in appearance and are much prized by some for garnishing purposes.

Many varieties of Kale have flattish leaves, but others have beautifully crimped and curled leaves resembling close-packed Parsley or green moss. The famous 'Jersey walking-sticks' are made from a variety of Kale or Tree Cabbage called *Chou Cavalier*, which often reaches a height of 10 ft. and grows for two or three seasons.

For diseases &c. see p. 1113.

BROCCOLI (BRASSICA OLERACEA BOTRYTIS ASPARAGOIDES).—The Broccoli resembles the Cauliflower in appearance, and is often regarded as such by the uninitiated; but it is a distinct variety and more hardy in constitution than the Cauliflower. Both vegetables, however, are remarkable for the crisp succulent white or creamy white mass in the centre of the leaves. This mass really consists of the inflorescence, that is, the flower stems and flowers, which have become condensed and abnormal by selection and cultivation for many generations. In the Broccoli the heads are smaller and yellowish-white, but in the Cauliflower are usually larger and more inclined to pure white. The leaves of the Broccoli also are more numerous and stiffer in texture.

Soil.—To grow Broccoli well the soil cannot be too rich and well drained. A rich and rather heavy loam, well dug and heavily manured the previous autumn, suits it best. The soil should be well set or hardened before planting, as the roots like to grow in firm surroundings.

Time of sowing.—Seeds may be sown very thinly in shallow drills about 6 in. apart from the beginning to the middle of April, and again two or three weeks later to obtain a succession. When the seedlings have developed 3 or 4 leaves they may be transplanted in dull showery weather if possible to the ground which was prepared the previous autumn, and may have produced a crop of early Potatoes in the meantime. Although it is possible to secure good crops by planting as late as the end of July, and even early in August, as a rule the best results are obtained by having all the plants in their places by the middle of June. The first seedlings above ground may be pricked out about 6 in. apart into a warm border about a month after sowing, and if left here for another month to become sturdy, they may then be transplanted in showery weather to their permanent quarters. The absence of showers, however, should not interfere with planting Broccoli at the proper time, but a good soaking with water should then be given in lieu of rain. The plants should be 2 to 3 ft. apart each way, the vigorous varieties being given the greater amount of space for development. The general treatment in regard to hoeing, weeding, watering &c. is afterwards the same as for Cabbages (see p. 1114).

Protection.—In severe winters it may be found advisable to protect the heads of the late kinds—that is, those for use in spring and early summer—by means of a little clean straw or litter. Or the leaves may be slightly cracked at the midrib or stalk and bent inwards over the heads.

In some places an operation called 'heeling in' is practised. It consists in bending the stalks over until the heads face the north or west. The object in view is to prevent the heads being injured by alternate frosting and thawing—the latter really doing more damage than the former. It is therefore considered better to have the heads facing north or west, as the sun will not then shine upon them, or only so feebly as to be of no importance. The operation of 'heeling in' is usually carried out during mild weather in November. If the plants are in rows running east and west, a trench is opened before the first row on the north side. All the plants in the first row are then bent over with the heads facing the north, and soil from the second trench is placed over the stems to keep them in the required position. The plants in the second row are then treated in the same way, and so on until the work is finished. If the rows are running north and south, it will be found more convenient to bend the plants so that the heads shall face westwards; but the work is precisely the same. Care, however, should be taken not to expose the roots more than is absolutely necessary, otherwise they may be injured by frost.

VARIETIES OF BROCCOLI

Among the Broccoli most useful for the garden are *Veitch's Autumn Self-protecting*, which is valuable for autumn and early winter use. Its firm whitish and compact heads retain their crispness and freshness a long time, owing to the protection they receive from the leaves which curl inwards and protect them a good deal.

Walcheren is a well-known variety and still one of the best for autumn use. *Mammoth White* is a compact-growing late Broccoli with deep green leaves, which curl over and protect the large white heads well. It is of good quality and continues in use for a long time. Other varieties for autumn and winter use are *Purple Cape*, *White Cape*, *Backhouse's Winter White*, *Knight's Protecting*, *Osborn's White*, *Snow's Superb*, *White Sprouting*, and *Purple Sprouting*. The latter is a distinct variety, and is often called the *Asparagus Broccoli*. It has purplish curled leaves, and instead of producing a compact head as in the ordinary varieties, it throws up numerous thick and fleshy purple shoots from the centre and also from the axils of the leaves. These shoots are produced in succession for a long time, and should be gathered before the flowers open. They are used in the same way as green Asparagus.

For use in spring and early summer may be mentioned *Alexandra*, an excellent variety of first-rate quality; *Cattell's Eclipse*, considered at one time to be the best late Broccoli cultivated; *Methven's June*, a very hardy sort standing the winter well, and remaining in use till nearly the end of June; *Wilcove's Superb White*, and *Veitch's Model*.

For diseases &c. see p. 1118.

CAULIFLOWER (BRASSICA OLERACEA BOTRYTIS CAULIFLORA).—The Cauliflower differs from the Broccoli chiefly in being a less hardy plant and in having heads of a more tender and finer flavour.

These heads consist of abortive flowers placed on short and thickened flower-stems, also aborted, the whole forming a dense white fleecy-looking and succulent mass.

Soil.—A good rich loamy well-drained soil and a warm sunny and sheltered position are required to grow Cauliflowers to the highest perfection.

For the autumn crop of Cauliflowers seeds of *Walcheren*, perhaps the only satisfactory variety for this particular purpose, may be sown out of doors the first week of April. *Veitch's Pearl*, *Sutton's King*, and *Veitch's Autumn Giant* are also good varieties and will give a succession until *Veitch's Autumn Self-protecting Broccoli* comes into use. It will therefore be unnecessary to make further sowings. The seedlings from these will be fit for planting out 2 ft. apart each way in well-prepared soil about the middle or end of June according to the season.

To have Cauliflowers in season about May and June, seeds must be sown in August in the north and not later than the first week in September for the south. When large enough the young plants may be pricked out into rich soil either in cold frames or in such a position that they can be readily protected during the winter. Except in frosty weather too much light and air cannot be given the plants. A damp and stagnant atmosphere must be guarded against if the plants are to come through the winter safely. They should therefore always be protected from cold drenching rains in winter. From the beginning of March onwards, if the weather is nice and mild, the plants may be transferred from their winter quarters to the open ground—a south sunny border is best—a few at a time, but they still require protection during cold frosty nights. This protection is best afforded by means of handlights. The latter, however, should never cover the plants in the daytime except during severe frosts, and then a little litter over them may also be needed. Where handlights are not available for shelter, any other receptacle will do at night time, such as a large flower pot with a little litter over it, or a wooden box &c.

When Cauliflowers are required in July and August seeds should be sown in pans or boxes in gentle heat in a hotbed or greenhouse in January or February. The seedlings must be transplanted into a cold frame in rich soil, and may be kept close for a few days until established. Afterwards on bright mild days they may be given plenty of light and air. By the first week in May and onwards they will be ready for planting in the open ground.

There are thus three seasons at which Cauliflowers may be sown, viz.: 1. In April to produce heads in autumn. 2. In August to produce heads in May and June after winter protection. 3. In January or February on hotbeds, to be transplanted in May and produce heads in July and August. This gives a fairly long period for the Cauliflower to be in use.

General Treatment.—Little more can be said than what has already appeared for Cabbages. But the more tender nature of Cauliflowers, and their inclination to produce heads prematurely, or 'button' as gardeners say, especially in dry summers, render it necessary to pay particular attention to drawing the soil up around the young plants, to keep the surface well stirred, not only to destroy weeds but to prevent evaporation. It is also an excellent practice to give liberal and frequent waterings in dry weather, occasionally with liquid manure.

A disease called 'blindness' sometimes attacks Cauliflowers raised in spring. This is caused by what is called the 'White Fly,' which cluster on the young heads and destroy them. This danger may be checked by sprinkling the crowns and leaves with soot when damp early in the morning.

Varieties.—There are comparatively few distinct ones. The best are *Early London*, *Early Snowball*, *Dwarf Erfurt* or *Mammoth Eclipse*, *Veitch's Autumn Giant* (for sowing in the open air in April and May), *Veitch's Pearl*, *Sutton's King*, and *Walcheren*. The latter is the latest of all Cauliflowers, and is as often as not grown as a Broccoli. It should be sown in April.

For diseases &c. see p. 1113.

KOHL-RABI (BRASSICA OLERACEA CAULO-RAPA).—This distinct vegetable is about midway between the Cabbage and Turnip, and its swollen fleshy stem is often used as a substitute for the latter.

The stem is almost round in shape, and varies in size from 3 to 8 in. in diameter. In seasons when the Turnip is fibrous and hot to the taste, Kohl-Rabi retains its delicate and agreeable flavour.

Culture &c.—Kohl-Rabi is now becoming better known in British gardens, and owing to its great hardiness is a crop worthy of attention. It likes a stiffish moist soil and is suitable for damp but well-drained situations. Seeds may be sown from the beginning of April to the middle or end of June in shallow drills about a foot or eighteen inches apart. When the seedlings are well developed—which usually takes from 4 to 6 weeks—they may be thinned out to about a foot apart in the rows, and the plants will be fit for use in three or four months from the date of sowing the seed. The Turnip-like stems should be left well above the surface of the soil when growing. During the summer months the soil between the rows of plants should be kept stirred with the hoe to keep the weeds down and also to prevent excessive evaporation of moisture from the soil during dry weather. The swollen stems are ready for use before they are quite fully grown.

Varieties.—There are several known, but the best for general cultivation are the *Early White*, which has roundish pale green or whitish stems 6–8 in. through; *Early Purple*, which has purplish stems, but is not so delicate or early as the *Early White*; and the *Early Dwarf*, a dwarfer form than the others.

SWEDE TURNIP or **TURNIP-ROOTED CABBAGE.**—This is closely related to the Kohl-Rabi, but its swollen stems, which are nearly as long as broad, usually grow more deeply buried in the soil. They are boiled and have a flavour like the Kohl-Rabi, and are held in greater esteem than Turnips by many.

Culture. — This is precisely the same as recommended for Kohl-Rabi above. There are two kinds usually grown—one with a yellow flesh, the other with a white flesh. In hot dry seasons they are more easily grown than Turnips, and do not lose their flavour or become stringy.

TURNIP (BRASSICA RAPA). — The Turnip belongs to the genus Brassica, like the Cabbage, Cauliflower, and other vegetables mentioned in the preceding pages. It is, however, not cultivated so much for its leaves (although these are often used as 'greens') but for the roundish or flattish fleshy roots. Strictly speaking the edible portion is not a root at all, but a short much-swollen stem. from the top of which leaves and flowers are produced, and from the base the slender tapering taproot and fibres.

Soil.—Turnips will succeed on any good garden soil that is not too heavy or too clayey, but prefer a good and rather light loam not too heavily dressed with farmyard manure, at least not immediately prior to sowing the seeds. Turnip soil is best prepared in autumn or early winter by digging or trenching and manuring as may be required. A fairly moist situation and cool positions are best for Turnips.

Sowing the seed.—The seed may be sown either broadcast or in rows or drills but as thinly as possible. Where large quantities are required it will be found economic to use a small seed drill. This useful instrument makes a shallow drill and sows the seed at the same time. The distance between the seeds can be regulated, and the subsequent thinning out will be a less tedious process. After sowing the soil is raked over and made level and firm, either by means of the feet or a small roller.

As birds are very partial to the seeds, the latter may be coated with sulphur paste or red lead before sowing, and this will prevent their depredations. A sprinkling of soot and lime over the surface of the soil after sowing will also be useful in checking snails, slugs, and other vermin.

Time of sowing.—For the main crop, the best time for sowing seed is about the middle of July, say St. Swithin's day, but in warm southern localities a fortnight later will be time enough. For succession seeds may also be sown as late as the middle of August and beginning of September in the south on ground from which a crop of Potatoes or other plants has been cleared. The tops of plants sown at this period are valuable for cutting as greenstuff in spring. Earlier sowings, however, may be made at intervals of a fortnight from early March to June when Turnips are required in summer and early autumn, but the plants are then inclined to run to seed, especially in dry summers, or become woody or stringy in flesh. As soon as the seed-leaves are pushing their way through the surface of the soil, it is advisable to give them a good dusting with a mixture of lime and soot early in the morning, while the dew is still upon the ground.

Thinning out &c.—When the young plants have made 4 or 5 leaves it is time to go over the rows with a small hoe, not only to destroy the weeds, but also to thin the seedlings out pretty freely, leaving 4–6 in. space or even more between the plants. A second thinning out is frequently necessary, in which case the plants should be left about a foot apart. By leaving the plants crowded they become stifled with growth and probably infested with vermin, so that the crop becomes a failure. In the event of dry weather the plants will receive much benefit from good soakings of water.

Storing.—When fit for use the roots should be taken up as required. Surplus quantities may be stored in cool dry and airy sheds free from frost. If the weather is not too severe, and the soil in which the Turnips are growing is dry and warm, the roots may be left in the soil, and pulled as wanted. A good plan for storing is to make heaps on a raised piece of ground, having a layer of litter or bracken beneath and all round the Turnips. The whole may then be covered with a layer of dry soil. Where dry airy sheds exist, however, it is scarcely worth while storing Turnips out of doors. The leaves or tops should be cut off, but not the roots at the base.

Enemies &c.—The Turnip is subject to the attacks of many insects, beetles &c., more so, perhaps, than any other Cruciferous crop. One of the worst pests is the Turnip Fly or Flea (*Altica nemorum*), a lively and voracious little beetle which attacks the young leaves as soon as they appear above the soil. The caterpillars of the Turnip Sawfly (*Athalia spinarum*) called 'Niggers' or 'Black Palmers' attack the leaves at a more advanced stage, and may be recognised by their dull yellow colour, and dense whitish short hairs. The caterpillars of the Turnip Moth (*Agrotis segetum*) are also very destructive in autumn, the more so as they are rarely seen. They live beneath the surface of the soil and usually feed at night time. They bore into the fleshy roots of the Turnip in autumn and take refuge in the holes they make. A closely related pest is the caterpillar of the Heart-and-Dart Moth (*Agrotis exclamationis*) which destroys the plants in a similar way.

Remedies.—Once any of these pests have taken a fair hold of a crop, it is a somewhat difficult matter to check them. The attacks of the Turnip Flea and Turnip Sawfly may be counteracted by dusting the plants more or less heavily with lime and soot early in the morning when the dew is still on the foliage, or late in the evening, when the pests will probably be feeding. The same remedy and hand-picking by candlelight seem to be the best means of destroying the caterpillars of the Turnip Moth and the Heart-and-Dart Moth. Watering the plants with briny water is also more or less effectual. Where a Turnip crop suffers a good deal from any of these pests, it is unwise to grow a second crop on the same piece of land, as similar results are almost sure to follow—as it is practically impossible to kill all the larvae or chrysalides of the pest. While they are fond of the Turnip, and other Cruciferous crops, perhaps, and attack them fiercely, they are, however, more or less harmless to other crops, such for instance as Peas and Beans.

For other diseases see p. 1113.

VARIETIES OF TURNIP

Among the best varieties may be mentioned ***Extra Early Milan***, a distinct strap-leaved variety which is fit for use early; ***Early Purple-topped Munich***, also a distinct and early variety; ***Early Snowball***, a fine variety with a white, sweet, and tender flesh; ***Early White Stone***, keeps well; and ***Early Strap-leaf White Stone***, an early variety of fine quality. For late use ***Veitch's Red Globe*** is an excellent variety.

RADISH (RAPHANUS SATIVUS).—As far as structure is concerned the Radish resembles the Turnip in that the swollen fleshy portion is really a stem which gradually passes downwards into the real root.

The Radish is supposed to have come originally from Southern Asia, but no wild plant has yet been found that can with any certainty be regarded as its progenitor. The wild Radish or White Charlock (*R. Raphanistrum*), which produces white or pale yellow flowers from May to September, and is more or less common in our cornfields, may possibly have had something to do with producing the cultivated Radish, but it is now a matter of mere speculation.

Soil.—Any light or fairly good garden soil will grow Radishes well, but it should be open and well exposed to the sun. Early spring crops usually have sufficient moisture, but if Radishes are required during the summer months, it is well to select a piece of soil which is naturally moist and cool rather than dry and hot.

Sowing.—Radishes are best sown in beds not exceeding 5 feet wide. The beds should have at least a good foot of space between them to form an alley or pathway, so that half the crop may be picked easily from one side and half from the other. The seed is usually sown broadcast and as thinly and evenly as possible. The surface of the soil is afterwards raked over, and may be made firm with the back of the spade, or where large patches are sown, with a light roller.

The first sowing out of doors may be made on warm sunny south borders during December and January. As the weather at that period of the year is more or less severe, according to locality, the seed beds should be covered with clean straw or litter. This need not be disturbed until the seedlings are well through the soil, and even then it should be removed only on warm bright days, and replaced towards night.

It is however a moot question whether there is any particular advantage in sowing Radishes so early as December or January. One of the chief points with Radishes is to grow them as quickly as possible, and it is obvious that the period mentioned is not one of rapid growth. If the first sowing in the open air be made not earlier than the middle of February, it will be found that the plants are quite as forward and better flavoured than those raised from seeds sown a month or two before.

As an alternative to this the seeds may be sown in cold frames, where there are sufficient for the purpose, but they must be protected by the lights in frosty weather. In fine weather these may be removed altogether, or tilted so as to allow an abundance of fresh air.

It is a good plan to sow seeds from the middle of January to the end of February on a gentle hotbed, which may be made as described at p. 46. As the plants are apt to be drawn in a frame, the seeds should be sown thinly, and plenty of air should be given on all favourable occasions. Many good gardeners also sow a fair quantity of Lettuce seeds with those of the Radishes, afterwards lightly raking the surface of the soil and gently patting it down with the back of the spade. The Radishes sprout first, and as they become fit for use may be pulled, or 'drawn' as gardeners say. This will leave plenty of space for the young Lettuce to develop.

From March onwards seeds may be sown at intervals of about a fortnight, or more rarely, according as Radishes are wanted or not. In the summer months, frequent waterings will be necessary, unless, as mentioned above, the seeds have been sown on naturally moist soil.

Maturity.—Radishes are best pulled when they have produced about the third or fourth rough leaf. If allowed to grow too long they lose their tenderness and flavour and become woolly or stringy. The quicker they are grown the better, and in this respect they resemble Turnips. It is a good plan, especially in dry weather, to water the beds thoroughly the day before the Radishes are pulled.

Enemies.—The Turnip Fly sometimes visits the Radish and treats it in the same way as it does the Turnip. A sprinkling of lime and soot when the leaves are wet or damp will check its ravages.

Varieties.—There are many of these so far as names go, but they may be roughly divided into (i) The *Turnip-rooted* varieties of which there are scarlet red, and white forms; (ii) The *Olive-shaped* varieties which include the white, scarlet, and French Breakfast forms; and (iii) The *Long* tapering varieties, like the Long Red, and Lady's Finger forms.

The **Java** or **Rat's Tail Radish** (*Raphanus caudatus*) is a peculiar variety, of which the purple or violet seed pods only are edible. They are 8–10 in. long, often twisted, and not so thick as a lead pencil, and should be used when about half-grown. The seeds should be sown thinly in the open ground in May, and about August the seed pods will be fit for eating in a raw state, like ordinary Radishes, or they may be pickled in vinegar.

SEAKALE (CRAMBE MARITIMA).—The Seakale is a Cruciferous native perennial with large sinuated densely glaucous or blue-green leaves. Of late years it has become a great favourite in British gardens, and is cultivated for the crisp and juicy growths which, however, must be blanched as described below before they are fit for use. On some parts of the south coast it grows luxuriantly just above high-water mark, and whitened shoots are obtained easily by covering the crowns in winter with a heap of sand or shingle.

Soil.—A deep and well-manured sandy loam is the best for Seakale, but it may be grown well in ordinary good garden soil which has been well dug or trenched, and manured in autumn or winter before planting. An open sunny situation is best.

Propagation.—Seakale is propagated (i) by cuttings of the fleshy roots, called 'thongs' by gardeners, and (ii) by means of seeds. The latter may be sown thinly in shallow drills 1½–2 ft. apart in March or April, and the seedlings afterwards thinned out so as to leave 9–12 in. between the plants. Their after treatment is the same as described for root cuttings.

Root Cuttings.—These are at once the easiest and best way of raising Seakale. Pieces 4–6 in. long are cut off the ends of the roots with a sharp knife either in December when the plants are lifted for forcing in greenhouses or hotbeds, or in March if they have been left in the ground. If cut in December the cuttings should be placed in sand or dry soil until the planting time in March. They are then planted in rows 1½–2 ft. apart, and 9–12 in. between the plants, the upper end of the root cutting being 1–2 in. beneath the surface of the soil. The whole is then levelled over, and a mulching of well-rotted manure may be placed between the rows at the time of planting, or a few weeks afterwards when new roots will be forming. All round the cut surface buds will sprout forth, but they should all be rubbed out except the strongest one. Beyond keeping the weeds down, little attention is necessary, except watering in very dry hot weather, and pinching out any flower stems that appear, until the autumn.

When the plants are to be forced out of doors it is a better plan to place the 'crowns,' not in straight rows, but about 9 in. apart in the form of a triangle. By adopting this method it will be possible to cover every 3 plants with one Seakale pot.

Forcing.—When the leaves have withered and decayed in autumn and been removed, the crowns of the plant should be protected from hard frosts by a small heap of fine coal ashes, or short litter. When it is desired to 'force' the shoots, each plant or crown may be covered with a wooden box, large pot, or handlight, after removing the leaves, litter, or ashes from the top. A certain amount of heat will be generated by heaping leaves, litter, or manure around and over the box, pot, or light. Where attacks of slugs &c. are apprehended it is wise to sprinkle the crowns and the surrounding soil with lime and soot.

From the beginning of December to the end of February more heat is naturally required to force the plants out of doors, and where Seakale is wanted during this period, the pots or other coverings over the plants should be covered with good thick layers of hot manure. After the plants have commenced to grow the temperature should not exceed 60° Fahr.

It is essential to exclude light, otherwise the stems will come greenish in the usual way, and possess none of that crispness and succulence associated with 'blanched' or whitened shoots. It takes about 4 to 6 weeks from the time of covering to produce nicely blanched 'sticks' of Seakale. By covering only a few plants at a time the supply may be kept up for a long period. A little air and light may be admitted when the stalks are almost fit for cutting. This will give the tips a purplish tinge, which is so much appreciated, and sets off the white stalks by way of contrast.

Cutting.—When the shoots are about 6 in. or more long they may be cut and prepared for use. When not required immediately, each shoot should have a small portion of the hard crown attached, and may be stood in a glass vessel having about ½ in. water at the bottom. This will keep the stems fresh and crisp for some time. The plants may be examined on warm bright days, about once or twice a week, according to the season and rapidity of growth.

After Treatment.—When the plants have supplied their quantity of blanched shoots for the season, they may be covered with dry leaves or short litter until growth has started again. A dressing of manure forked into the soil around the plants will then be beneficial, and the plants are then allowed to grow without flowering until the following autumn or winter, when the same process is repeated, and may be continued for several years out of doors. When forced in a high temperature indoors the crowns are best thrown away, and renewed by means of root cuttings.

It may be mentioned that there are special pots on the market used for placing over Seakale plants. They are bell-shaped, with a movable cap or top. Somewhat similar pots are used for forcing Rhubarb out of doors.

Group II.—LEGUMINOUS CROPS

PEA (PISUM SATIVUM).—The Pea is a hardy annual belonging to the Leguminous order (p. 822), and as a garden crop is held in the highest estimation for its seeds, either in a green or dried state. The plants have a climbing habit and usually cling to stakes or other supports by means of the tendrils, which are in reality specially modified leaves, while the large leaf-like bodies are more correctly described as stipules (see Glossary, figs. 63, 95, 108). The flowers spring from the axils of the leafy stipules and are white or coloured according to variety. Their general form is as shown in the Glossary, fig. 5, p. 2.

Soil.—Peas enjoy a rich loamy well-drained soil, but will also produce good crops on ordinary garden soil which has been well manured and dug the previous autumn or winter. The ground for Peas should not be manured immediately preceding the sowing of seeds, or rank heavy manures should at least be well buried beneath the drills. In wet seasons a light dry soil is generally best, and in hot dry seasons a rather heavy and moist one (see article on Soil, p. 61).

Time of sowing.—Seeds of Peas may be sown at intervals of two or three weeks from the middle of November to the end of June the following year, but not out of doors between the middle of November and the middle of January. Drills about 2–3 in. deep and 6 in. wide, preferably north and south running, may be opened with a hoe. In each drill two rows of Peas may be sown, the seeds in one alternating with those in the other. An excellent method of sowing Peas, especially on dry and porous soils, is to open a trench about 9–12 in. wide and 6–9 in. deep, for the second early and following sowings, covering the seeds as stated below. The great advantage of having trenches in such soils is that the plants will receive the full benefit of the rain and water. When Peas are sown on the level and the soil is drawn to them when young, the water is drained away, and during hot seasons this is a serious disadvantage.

As a rule Peas are sown much too thickly, with the natural consequence that the plants choke each other later on, and become a prey to mildew owing to the air being unable to circulate freely among the foliage. In the case of early sowings, however, the seeds may be sown rather thickly, as some of the seedlings are likely to perish by mice, slugs, or other misfortunes, and nothing looks worse than to see great gaps in the rows when the plants are above the soil. Some writers recommend sowing the seeds of maincrop varieties 2–3 in. apart in the rows, so as to give individual plants more space for development. This advice looks very well on paper, but in actual practice will lead to disappointment in many cases, because here again accidents will happen—mice, birds, bad seasons, &c., each plays a part in destroying the seeds, and it is therefore safer to sow rather thickly so as to be sure of securing full rows and a good crop. Before covering the Peas with soil, a little soot and lime may be sprinkled along the drills as a prevention against snails, slugs &c. The soil is trodden down firmly with the feet, or levelled with a rake if in light and fairly dry condition.

The first sowing of Peas in November should be on a warm sunny border facing south or south-west. When the plants are 2–3 in. above ground, the soil should be drawn up on each side to the stems as a protection against frost, and a mulching of short well-rotted manure will now be also useful. Where cold frames exist and are not used for anything else, they may well be utilised for the first sowings of Peas. The lights should be kept off on all favourable occasions, and should only be used as a protection against severe frosts.

Sticking Peas &c.—When the plants have made a little more growth they should have sticks put to them. The sticks should interlace or cross each other at the top, and so that the Peas may climb them properly, small twigs or brushwood may be stuck to the plants at the base leading them in the right direction. As a rule the sticks should be long enough according to the variety, say 3–5 ft. high, although now there are dwarf varieties that scarcely require staking at all—but they are all the better for short stakes.

The distance between the rows may vary from 4 to 6 ft. according to the height of the variety, so that one row will not shade another from the sun. The intervening space between the rows need not be wasted, and may be cropped with Lettuce, Radishes, Cabbage, Spinach &c. if desired.

Protection.—All sowings up to March require more or less attention when the seedlings are above the ground, according to the severity of the weather. In the event of hard frosts the young plants should be protected with a layer of clean straw, litter, or bracken fronds, which, however, may be removed on bright days.

Maincrop sowing.—About the middle of March, say St. Patrick's Day, March 17th, is a good time for sowing, and in about 3 months from that date, say about the middle to the end of June, the Peas will be fit for use. The plants may be mulched and staked as described above in due course.

Late crops.—The seeds of these are sown up to the end of June, and they are fit for use about 3 months from the date of sowing. The end of September or middle of October is therefore the latest period to have Peas out of doors in most parts of the kingdom, and in northern localities scarcely so late as this.

General treatment.—Beyond mulching the young plants, staking, and keeping the weeds down between the rows, Peas require little attention. Hot dry seasons, however, necessitate frequent and abundant waterings, and an extra mulching round the base of the plants will keep the soil cool, and prevent excessive evaporation.

Pea picking.—As soon as the pods attain a fair size they should be picked. This is a great boon to the plants, as their strength is not exhausted in the process of ripening seeds. Fresh flowers are also developed as a result of frequent picking, and the crop by this means can be extended over a longer period than if the pods are allowed to remain until they approach the seed-ripening stage.

When the plants are in bloom some gardeners pinch out the points of the shoots, with a view to having the sap diverted to the quicker formation of pods. The same practice applied to Dwarf, Broad, and Runner Beans has the same beneficial result.

Enemies &c.—Among the worst of these may be mentioned mice, millipedes, slugs, and snails, which eat the sprouting seeds; Pea and Bean Weevils destroy the young plants by feeding on the leaves, as do also the caterpillars of various moths. Indeed there is no part of the Pea, from the sprouting seed to the swelling pod, that is not liable to attack from some foe or another. Wireworms eat the roots, and Green Fly (*aphides*) smother the young shoots.

Remedies.—A good sprinkling of lime and soot in the drills may be given before and after covering the seeds, and in the event of caterpillars, weevils &c. attacking the stems and leaves, a dusting of lime and soot when the dew is still on the plants will prove a good remedy. Where mice exist, they must of course be trapped, and birds must be checked by placing wire guards or netting with narrow meshes over the rows of young plants. Netting may also be required when the pods are swelling. Thin black—not white—cotton stretched over the rows is an excellent preventive against birds. They do not readily see the black cotton, and in their hurry to devour the plants become entangled in the threads, apparently much to their astonishment. After one or two attempts they generally desist.

Besides insect pests Peas are often subject to attacks of Mildew (*Oidium Tuckeri*), brought about by dryness at the root, or great variations in temperature, and inclement weather. Syringing the plants with a fine spray of hot water (about 150° F.) will check if not kill the mildew; or the leaves may be dusted with sulphur early in the morning when the dew is on the leaves. Watering, mulching &c. should also be looked to if they have been neglected.

VARIETIES OF PEAS

These are now becoming simply bewildering in number, and every year each tradesman has his own list of new varieties. It is, however, much easier to invent good names than to raise good varieties, and many of the old and well-known varieties are still the best. For the sake of convenience those recommended have been divided into *Early*, *Maincrop*, and *Late*, and it should be remembered that it is a mistake to grow too many varieties, except for the sake of experiment.

Peas are also classed as 'wrinkled' or 'round' and 'smooth,' according to the skin of the seeds. What are called 'Marrowfat' Peas are those of a particularly good rich quality and flavour.

Early Peas.—These may be sown at intervals from November to February to give the first crops about the end of May and June.

American Wonder.—A dwarf wrinkled Marrow Pea 9–12 in. high, with a compact habit. The pods are about 2 in. long, straight and well filled with highly flavoured seeds. A heavy cropper.

Ringleader.—A fine Pea 2–3 ft. high, rather slender in habit. The straight pods are well filled with smooth round seeds. This is still considered one of the best early Peas. Sutton's *Bountiful* is a good early Pea, and is fit for use 2 or 3 days before *Ringleader* when both varieties are sown on the same day.

Sutton's Early Giant.—This is one of the largest-podded early varieties recently raised. It grows about 3½ ft. high and has well-filled pods of a dark green colour covered with a dense bloom. It is fit for use a day or two after *Ringleader* and *Bountiful*.

William Hurst.—An excellent dwarf blue wrinkled Marrow Pea, about 1 ft. high. The seeds are of fine flavour, and the straight pods are produced in great abundance.

William the First.—This is one of the best early Marrow Peas. It grows 4–5 ft. high, and has pods about 3 in. long, filled with smooth green seeds of excellent flavour.

Maincrop Peas.—These may be sown from the beginning to the end of March, and will be in season from June to July.

Champion of England. — A strong-growing wrinkled blue Marrow Pea 5–6 ft. high. The long, slightly curved and flattened pods are well filled with highly flavoured seeds, and are borne in great abundance.

Dr. Maclean.—A strong-growing blue wrinkled Marrow Pea 3–4 ft. high, with large handsome pods filled with large and excellent seeds.

Stratagem. — A dwarf wrinkled Marrow Pea 2–2½ ft. high, remarkable for its very large pods, often 6 in. or more long, and well filled.

Veitch's Perfection. — A highly esteemed wrinkled blue Marrow Pea about 3 ft. high. The large straight pods are well filled and borne in great numbers.

Other good varieties in this section are *G. F. Wilson*, a wrinkled blue Marrow, 4 ft.; *Laxton's Supreme*, 4–5 ft.; *Sharpe's Queen*, blue wrinkled, 3 ft.; *Telephone*, wrinkled, 3–5 ft.; and *Autocrat*, blue wrinkled, 4 ft.

Late Peas. — These may be sown at intervals during April, May and June, so as to yield in August and September. The varieties already mentioned as Early and Maincrop may be used for late sowing, and also the following:—

British Queen.—A vigorous wrinkled white Marrow Pea, 5–6 ft. high. Pods very long and straight, well filled with seeds of fine flavour.

Culverwell's Giant Marrow.—This is a very prolific blue wrinkled Marrow Pea 5–6 ft. high. The pods are among the largest, often 7 in. long, well filled with large seeds of fine flavour. The plant is vigorous and branches freely, and the seeds should not be sown too thickly.

Ne Plus Ultra.—This wrinkled Green Marrow Pea is an old favourite, and should be grown in preference to others in small gardens, as it is certainly one of the best and freest croppers. It grows 6–7 ft. high, and has dark glaucous-green pods well filled with seeds of an excellent flavour.

BROAD BEANS (Vicia Faba). — The Broad Bean belongs to the genus Vicia described at p. 347, and besides the name given above is also known in botanical circles as *Faba vulgaris*. It is an annual plant and has been cultivated almost from time immemorial for the nutritious character of its seeds. It is a native of the East.

Soil. — A good and rather stiffish loam suits the Broad and other Beans well, provided it is well drained and fully exposed to the sun. All ordinary good garden soils produce excellent Broad Beans, and only require deep cultivation and plenty of manure in autumn. They are best grown in a different plot of ground each year (see 'Rotation of Crops,' p. 1104; and 'Soil,' p. 61).

Sowing.—About the middle of November in the south, and October in the north, the first sowing of Broad Beans may be made, in rows about 2–4 ft. apart. Each row may have the seeds placed alternately or zigzag 3–4 in. apart, and about 3 in. beneath the surface of the soil in the drills. The soil may be trodden over them and raked level. A warm sunny position should be chosen for this late autumn or early winter sowing, and the best variety for the purpose is that known as *Early Mazagan*, which is very hardy and early, and one of the best for autumn sowing.

It is however questionable whether there is anything gained by sowing seeds at this particular period of the year. If the winter is mild and not too wet or frosty, a slight advantage may be gained, perhaps a week or ten days, but I have seen Broad Beans sown the first week in March picked before those sown in November. It seems therefore as if the ground is occupied about 4 months to no good purpose. It would be better to have it dug or ridged up so that the action of the weather would in the meantime bring it into a better state of fertility for spring planting.

About the end of January, and onwards to the end of June, seeds of the following varieties may be sown at intervals, and in the order given, namely *Seville Long Pod*, a distinct and dwarf variety with remarkably long pods; *Green Mammoth Long Pod*, *Green Masterpiece*, *Long Pod*, a heavy-cropping variety; and the *Broad Windsor* varieties, such as *Taylor's* and *Harlington*.

General treatment.—When the plants are 2–3 in. above the soil they may have earth drawn up to them on each side. A mulching of short decomposed manure will also be beneficial, especially to the earlier crops, to protect the roots from severe frosts. In hot weather a mulching is also valuable in preventing rapid evaporation, thus enabling the plants to withstand drought better.

It is a common practice when the sturdy stems have reached a height of 2–3 ft. to pinch out the tops with the finger and thumb. This process is called 'topping,' and is performed with a view to hastening the development and maturity of the pods, by means of the extra sap thus placed at their disposal. It is also useful in getting rid of the black aphides which often crowd the ends of the young shoots and look very unsightly.

As a rule where the plants have been grown sturdy and strong, and not too close together, it is quite unnecessary to support them in any way. Where, however, they are likely to be blown about by wind it may be found necessary to keep the plants upright by running strings along each side of the row, from stout stakes driven into the soil at intervals.

Pests.—One of the worst pests which attack the Broad Bean is the Black Fly (*Aphis Fabæ* or *A. rumicis*), also called the Black Dolphin or Collier blight, which clusters on the young and succulent shoots, disfiguring them very much, and often greatly interfering with the functions of the plant. Fortunately, however, they often appear after the pods are well set, and if the infested tops are cut off and burned immediately little harm is done. Where this is not possible, however, a sprinkling of lime and soot early in the morning when the plants are wet with dew will get rid of them. Also a spraying with very soapy water, or Paris green, the latter at the rate of 1 lb. to 30 or 40 gallons of water. After using this once or twice it is wise to syringe or spray the plants afterwards with clean water.

DWARF, FRENCH, or KIDNEY BEAN (PHASEOLUS VULGARIS).—This is not nearly so hardy as the Broad Bean, and consequently cannot be sown out of doors so early. Like the Broad Bean it is an annual, but is dwarf and bushy in growth, and very suitable for a summer edging in the kitchen garden as well as for growing in rows in the usual way. It is a native of S. America and is a quick and vigorous grower. The leaves are composed of 3 more or less triangular leaflets, and the flowers are borne in clusters from the axils.

Soil.—This must be rather lighter and richer than for Broad Beans, and also well drained. Positions facing south or west are the best, and the earlier crops require sheltered situations. They flourish on a south sunny border and soon come to maturity in good soil.

Sowing.—Seeds may be sown out of

doors from the middle of April to the end of June or even July in the south, and the beans are fit for picking in about 2 months from the date of sowing.

Where an early crop is required seeds may be sown in March in a cold frame or in boxes in a greenhouse, and about the end of April in southern parts, and in favourable weather the young plants may be transferred to the open ground. In the event of late spring frosts in May a light covering of clean straw or litter, or even a flower pot or small box over each plant at night, will afford ample protection. The plants when transferred to the open ground in this way should be 9–12 in. apart, and the rows may be about 2–3 ft. from each other.

When seeds are sown in the open ground they should be about 3 in. apart, as the chances are that a very fair percentage will not germinate. This is often due to the attacks of a small white grub which eats away the germ of the seed. It is not a bad plan, especially where ground is scarce, to sow rows of French Beans between Cabbages, Lettuces, or other crops which will give protection from frost when the young plants come above the surface. The plants are afterwards thinned out to the proper distance apart if too thick. Raising the plants in cold frames as mentioned above, and planting out, is perhaps on the whole preferable, as very few plants are lost, and the labour of thinning out is saved. The drills, however, may be dusted with lime and soot before and after sowing, as recommended for Peas (p. 1128) and other crops.

General treatment. — This is practically the same as for Peas and Broad Beans, and consists in pulling the earth up to the young plants, mulching with manure, watering freely in hot dry weather, and keeping the weeds down by using the hoe between the rows.

Picking. — The Beans should be picked before they become too tough and leathery in texture. When fresh and green the strings or fibres in the pods are not so evident, but later on they have to be detached from the Beans before cooking. Great efforts are made to obtain a Dwarf Bean which shall be 'stringless,' and there are indications that this desirable result will be attained very shortly.

By frequent picking the plants remain much longer in bearing, and are not exhausted so quickly. A few of the finest plants may be allowed to ripen their pods for seeds the following season, but it is wise to have a change of seed every two or three seasons.

Varieties. — The best of these are *Canadian Wonder*, a very heavy cropper; *Negro Long Pod*, very free and early; *Ne Plus Ultra*, very dwarf and compact, early, and delicate in flavour. There are many other varieties in catalogues, but the above are the best for outdoor gardening—others being more suitable for forcing during the winter months in a high temperature in greenhouses.

RUNNER or CLIMBING BEAN

(Phaseolus multiflorus).—This is practically a climbing variety of the Dwarf French Bean, and having the same nature and tenderness requires to be grown in the same way. It is a native of S. America, and although naturally a perennial it is grown in our climate as a tender annual under the popular name of *Scarlet Runner*.

Soil.—Although any ordinary good garden soil will produce excellent scarlet Runners, they prefer a light rich loam which should have been deeply dug or trenched and well manured some time previous to planting or sowing.

Sowing.—The seeds of Scarlet Runners may be sown out of doors at the same time as those of the French Bean, that is, from April till the beginning of July. The first sowing should not be made before the end of April or the first week in May in bleak localities, as the young plants, if above the soil too soon, may be cut down by frost. They should have the soil drawn up to them, and may be also mulched and well watered during the summer months to obtain the finest results. It is an excellent plan to sow the seeds in trenches 9–12 in. wide and 6–9 in. deep, as recommended for Peas, especially in dry porous soils.

As the plants develop, however, they must be provided with stakes 6–8 or 9 ft. high, in the same way as Peas (p. 1123). When grown in rows, the latter should be 4–6 ft. apart, so that the plants shall not cast too much shade upon each other; or they may be grown as an ornamental as well as a useful crop, to cover up the sides of walls, railings, fences &c. Strings arranged horizontally and vertically may be fixed for the plants to climb up, and during the summer months when in full bloom they are a remarkably pretty sight, quite worthy of the flower garden. Scarlet Runners may also be grown without supports of any kind if the tops of the young plants are pinched out when about 2 ft. high, afterwards repeating the process when necessary.

By frequently picking the pods, the plants continue to develop fresh blooms, and from these pods may be picked almost till the approach of frost.

VARIETIES.—The following are most grown:—The *Common Scarlet Runner*, *Painted Lady* (or *York and Lancaster*). *Ne Plus Ultra*, and *Scarlet Champion*.

Group III.—UMBELLIFEROUS CROPS

CARROT (DAUCUS CAROTA). — The Carrot is a hardy biennial and found in a wild state in the British Islands and throughout the North temperate hemisphere generally. It has been much improved by good cultivation and is highly valued for its fleshy taproots. The leaves are very much divided as in many other plants belonging to the Umbellifer Order (see p. 464), and if the plants are allowed to grow on for two seasons, small white flowers will be produced the second season and ripen seeds.

Soil. — A deep and well-dug or trenched sandy loam is best for Carrots, but any well-tilled garden soil will produce excellent crops. The ground should be prepared and manured in autumn or winter, so as to be in a good condition for sowing in spring. It is not wise to manure the ground in spring, as forked and unsightly roots often result from the grossness of the manure (see 'Soil,' p. 61). As a rule it is better to sow Carrot seeds after some crop for which the ground has been heavily manured. In such a case no more manure is needed, and it is only necessary to deeply dig the soil early in winter.

Sowing. — Seeds may be sown at intervals from February to the end of June in fine weather when the soil is loose and friable. Early crops are sown in February, but must be protected with litter for a time; main crops are sown in April, and late ones up to the end of June or July in southern districts. The shallow drills should be about 1 ft. apart, running north and south if possible. The seed should be sown very thinly, and, to assist in this, may be mixed with sand or ashes. A dressing of lime and soot on the soil both before and after sowing will prevent attacks of slugs, wireworms, and other pests. As the seeds are small they need not be covered heavily. An extra early crop may be obtained by sowing in cold frames in January and February. Plenty of light and air should always be given when possible, only covering the plants in times of severe frost or cold chilling rains.

Some gardeners also make a sowing of Carrots, such as *French Forcing* and *Scarlet Horn* in August and September, on warm sunny and sheltered borders, so as to secure a crop the following spring. When sown at this late period the roots must remain in the ground during the winter, and in the event of severe weather must be protected with a layer of soil an inch or so in thickness, or a layer of dried leaves, litter &c.

Thinning out.—When the plants are 2-3 in. high they must be thinned out to about 4 inches apart for the early varieties, and 6-9 in. apart for the Main-crop and later kinds. Weeds of course are attended to at the same time, and the space between the rows may be kept clean by the use of a small hoe, and in dry weather loosening the soil with a hoe, or watering will be very beneficial. In the event of any insect pest appearing, a dressing of lime and soot, or fine ashes mixed with paraffin may be strewn among the plants.

Storing.—In autumn when the beautifully cut and ornamental foliage has been bronzed and purpled with maturity the roots may be carefully lifted with a fork, and having severed the leaves about ½ in. from the crown, they may be stored in soil either in heaps or side by side in layers, with the tops pointing outwards, with soil and Carrots alternating, so as to prevent the generation of heat. Heavy rains may be kept off by a thatching of litter, bracken, fern &c.

In the event of the tops starting into growth after storing the roots should be freshly arranged in the soil. When available, silver sand as used for potting purposes is an excellent medium for storing

Carrots and Beet, as it does not hold the moisture like soil, and consequently does not start the crowns into fresh growth so soon.

Insect pests &c. — If the ground is dusted with soot as recommended before and after sowing, insect pests are kept in check. Should they, however, appear on the plants, a dusting with similar material early in the morning when the dew is on the foliage will destroy them. The worst enemies are a kind of Aphis (*A. Dauci*), and the Maggots or 'Leather Jackets' of the Crane Fly (*Tipula oleracea*), the latter often attacking the roots under ground. A watering with slightly salty water is useful in driving them away.

VARIETIES.— For early crops *Early Nantes*, an excellent 'stump' rooted variety, and *Early Horn* may be sown in February. In March and April *Altrincham Selected*, *James Scarlet Intermediate*, and *Long Red Surrey*, all fine varieties, may be sown for main crop. For late crops sown in May and June, the early and maincrop varieties may be sown again.

PARSNIP (PEUCEDANUM SATIVUM). In a wild state the Parsnip is found in waste places throughout Britain and Northern Europe. Like the Carrot it is a biennial, and must be grown for two seasons if it is required to produce flowers and seeds. The tap roots are longer than those of the Carrot and are usually whitish in colour. The leaves are also much divided, but the leaflets or segments are much larger and coarser than those of the Carrot.

Culture &c. — The Parsnip requires to be treated almost in the same way as the Carrot. The soil, if anything, should be rather deeper, richer, and moister, and should not be manured immediately before sowing the seeds. In autumn and winter it should be well and deeply dug or trenched and manured, so that the roots may be induced to strike straight downwards. They will thus develop a good and regular shape, and not become 'fanged' and divided into finger-like growths, as is often the case when grown in poor shallow soil, heavily laden with rank manure near the surface. If possible Parsnips should always follow some other crop of a quite different nature in accordance with the principles outlined under the 'Rotation of Crops,' p. 1104. Ground that has produced a crop of Lettuce, Cabbage, or Onions will suit Parsnips.

Sowing.—Seeds for the main crop of Parsnips may be sown from the beginning to the end of March in shallow drills 15 to 18 inches apart. To check insect attacks the soil may be sprinkled with lime and soot before and after sowing.

After sowing the seeds are lightly covered and the soil pressed down with the feet and raked over.

For later crops, seeds may be sown about the middle of May, and the roots from them will be ready for use the following spring. It is, however, rarely that sowings so late as this are made. One good sowing is made in March, and sometimes in February by some growers.

Thinning &c.—When 2–3 in. high the plants are thinned out in the same way as Carrots, about 4 in. apart. Later on when the plants have become larger and stronger, the best may be left about 1 ft. apart, certainly not less than 9 in., all the others being hoed up. It is a mistake to grow the plants too closely together, as being rich feeders they take a good deal of nourishment out of the soil. When well established it is only necessary to keep the weeds down with a hoe between the rows and plants, and in dry hot summers frequently stirring the surface with a Dutch hoe acts as a mulch and prevents excessive evaporation from the soil. Indeed, it is on the whole better to leave the roots in the soil if possible, as they retain their plumpness and juicy flavour instead of becoming spongy and tasteless.

Storing.—About the end of October or during November the roots may be taken up and stored in the same way as Carrots (p. 1128), or they may be left in the soil, if the latter is not wanted for another crop, until early spring. A sufficient number of roots however should be taken up in mild weather for use during severe frosts.

Insects.—These are pretty much the same as attack the Carrot, although the maggots of the Celery Fly (*Tephritis onopordinis*) often attack and blister the leaves. When these are noticed, they are best taken off and burned. If, however, the ground has been dusted with lime and soot at the beginning when seed sowing, and afterwards when the leaves appear, or after thinning has been done, the crop will be kept free from pests.

The dusting is always best when done early in the morning while the leaves are wet with dew.

Varieties.—There are only a few of these, the best for general cultivation being the *Hollow Crown* or *Student*, *Jersey Marrow*, *Maltese*, and *Elcombe's Improved.*

CELERY (Apium graveolens).—The Celery belongs to the same family of plants as the Carrot, Parsnip, Parsley &c. (Umbelliferæ, p. 464) and is found in a wild state throughout the British Islands and the temperate regions of the Old World. It is biennial in character like the Carrot and Parsnip, and has a rather fleshy fibrous root. The deep green leaves are pinnately divided into numerous triangular and more or less coarsely toothed segments.

Grown in a natural state the leaf stems are far too bitter for consumption as a salad, but when chopped up and used for flavouring soups &c. they are excellent. When, however, light (see p. 40) has been excluded from them by means of covering or 'earthing' them up with soil the formation of chlorophyll (p. 40) is prevented, the stems assume a whitish or blanched appearance, and have a crisp and agreeable flavour, which renders them one of the best of salads.

Soil.—A deep rich loamy soil, of a heavy and rather moist nature, produces fine Celery. Thorough drainage, however, is essential, and also plenty of rich manure in a well-decomposed state. If the soil has been well dug and trenched, or ridged up during the winter months, so much the better, as it will be cleaner, sweeter, and more fertile by planting out time.

Raising Celery.—Seeds may be sown in gentle heat about February and March, and in April for later crops. Shallow boxes filled with light rich sandy loam and leafsoil may be used for sowing the seeds. The soil should be well watered, and the seeds sprout freely in a very short time.

Pricking out.—When large enough to handle comfortably the earlier seedlings should be pricked out (see p. 46) about 4 in. apart into somewhat deeper boxes filled with rich soil, or into cold frames protected from frost. They are kept well watered and given plenty of light and air when once established, so as to induce a strong sturdy growth previous to transplanting in the open ground. The later seedlings, however, may be transferred direct from the seed boxes or pans to a rich soil, preferably on a west border, as a south one would be too hot and dry. especially in southern parts.

Making the trenches.—The trenches in which Celery is to be planted should run north and south if possible, and be not less than 1 ft. wide and 1 ft. deep. A distance of at least 4 ft. should separate one trench from another, and where space will permit, 5 ft. may be the limit. The soil taken from the trenches with a spade is spread evenly over the intervening spaces. The bottom of the trench may have a dressing of short well-rotted manure forked into it, at the same time breaking the soil up finely. If the trenches have been made in winter or early spring, the intervening space, 4–5 ft. wide, may be utilised for producing a crop of Lettuce, French Beans, or early Peas, before the soil is required for 'earthing up' the Celery plants.

Planting Celery.—By the first or second week in June, according to the weather, it will be generally safe to plant Celery in the trenches which have been prepared, but the plants from the earlier sowings may be transferred to the open air in May. Dull showery but mild weather should be chosen for planting out if possible, but failing this the work is best done late in the afternoon or evening. Each plant should be lifted carefully from the box or frame in which it has been grown, with a hollow trowel, retaining as much soil around the roots as possible. The soil around each plant should receive a good dressing of lime and soot as a preventive against slugs &c.

Although market gardeners sometimes grow 3 or 4 rows of Celery in one trench. which is correspondingly wide, one row of plants in each trench is the usual practice in private gardens. The plants should be 6–12 in. apart in the rows along the centre of the trench. A hole for each should be made with the trowel and the soil carefully and firmly pressed round the slender fibrous roots. As the plants are sure to be checked, no matter how carefully transplanted, the strain upon the injured roots may be relieved by cutting or pinching off some of the older leaves on the same principle as recommended for planting young fruit trees (see p. 1082). A good soaking of water immediately after planting will be of great benefit to the plants. In the event of very hot weather following immediately they may be shaded during the hotter portions of the day with fern fronds or sheets of newspaper until the new roots have been developed and taken a good hold of the soil.

Earthing up Celery.—This is a much more important operation in the cultivation of Celery than with any other garden crop. It consists in drawing the soil up to the plants first on one side, then on the other, with the object of keeping the growing stems in perfect darkness, thus checking the development of the green colouring matter called Chlorophyll (see p. 88), and stimulating the formation of starchy matters.

Earthing up should always be done in fine weather, when the soil is in good condition, and not when it is very wet and sticky. The ridge is to be widest at the base, gradually tapering upwards, so that the rain readily drains away. On each occasion before drawing the soil up to the plants it is a good plan to give a dressing of lime and soot so as to check the attacks of vermin.

Some gardeners do not earth Celery up until the plants are almost fully developed, and there is nothing to be said against the practice as good well-blanched stalks are produced. The intervening soil between the rows is also available for a longer period for producing other crops in the meantime.

As a rule, however, most gardeners earth Celery up at intervals of three or four weeks during the season until the approach of frost. The first earthing up should not take place until the plants have grown at least a foot or more high, and many failures with Celery arise from being in too much of a hurry to begin this operation.

The soil from the sides of the raised beds is chopped down with a spade and carefully placed against the plants. Great care is taken not to cover the young and tender centres or crowns of the plants with the soil, as this causes blindness and more or less effectually stops further growth.

After the plants have had the soil placed around them on each side by the spade, it is well worth while to go over each row afterwards, holding the leaves of each plant in one hand and working the fine soil all round them with the other. This will keep the leaves close to the crown, which is the only portion really requiring abundance of light so that it may grow freely and quickly. When the last earthing up has taken place, only the tips of the leaves should be seen jutting out from the surface of the ridge.

Watering. — In hot weather and especially in light dryish soils, Celery plants should be frequently and liberally watered until the final earthing up. If neglected the plants become stunted in growth, and in consequence perform the very natural process of 'bolting,' that is, they develop flowers and seeds the first season of growth instead of the required stems and leaves. The addition of soot to the water will prove highly beneficial to the growth of the plants, and also be effectual in keeping down the attacks of a tiny white maggot which very often feeds upon the blanched stems, making them very unsightly and quite unpresentable at table.

Pests.—Besides the small white maggot just mentioned, one of the worst pests attacking Celery is the maggot of the Celery Fly (*Tephritis onopordinis*) already referred to under Parsnips (p. 1129). This maggot springs from eggs which have been deposited *beneath* the surface of the leaf, and spraying with insecticides is therefore practically useless. Should an insecticide be powerful enough to kill the maggot thus protected by the cuticle of the leaf, it will likewise destroy the foliage.

The best and apparently only remedy at present is the tedious one of picking off the affected leaves and burning them at once. They should not be thrown on the rubbish heap. If, however, the soil and plants are well dusted with lime and soot at intervals after planting out, and if soot is added when watering during the season, Celery will suffer but little from this pest. The maggot that attacks the stems in the dark is on the whole a worse pest, as its ravages are not apparent until the plants are lifted for use.

VARIETIES OF CELERY. — There are white-stemmed and red-stemmed varieties of Celery, all more or less worthy of general cultivation. Among the WHITE may be mentioned *Cole's Crystal White*, very crisp and fine in flavour; *Henderson's White Plume*, an American variety which requires very little earthing up, as it is inclined to blanch naturally, and has variegated foliage; *Sandringham Dwarf*; and *Wright's Giant White*, one of the best grown, and of fine flavour. Among the **Red** forms are *Leicester Red*, *Ivery's Nonsuch Pink*, *Major Clark's Red*, and *Standard Bearer*, the latter having a sturdy compact habit, and a good heavy cropper.

CELERIAC (Apium graveolens rapaceum).—As may be seen from the botanical name, this is a variety of the ordinary Celery. Instead, however, of producing long sturdy leaf-stalks and leaves, the lower portion becomes very much swollen and Turnip-like, and hence is often called Turnip-rooted Celery. These swollen stems are cut and sliced and are used in salads, for flavouring soups &c., especially on the Continent.

Culture &c.—This is practically the same as detailed above for ordinary Celery. The seeds are sown in March and April in boxes, pricked out when large enough, and transplanted to the open ground in June, each plant being about 1 ft. from its neighbour.

As the stems are not required, it is unnecessary to blanch them, and the plants therefore need not be grown in trenches as with ordinary Celery. All side shoots and side roots should be removed during the season, and also some of the outer leaves if necessary. The soil also may be drawn away from the tuberous stems occasionally during the above operations, but when nearly mature in autumn may be covered with soil so as to blanch them.

The stems may be left in the ground for the winter if not too wet, but should be protected with a covering of litter or leaves against the frost. Or they may be lifted and stored in dryish soil like Carrots and Parsnips (p. 1128).

PARSLEY (Carum Petroselinum). The Parsley is a hardy biennial belonging to the Umbellifer Order (p. 464) and is said to be found in a truly wild state in the Mediterranean region. In a cultivated state it is very popular for garnishing, flavouring soups &c., and is in great demand practically from one year's end to another.

Soil.—Any good garden soil, not too light nor too heavy but well drained, is suitable for the cultivation of Parsley. It does not, however, always succeed even with the best attention, and may be regarded as a fickle grower. It will flourish for some seasons, but afterwards will make only a miserable display of foliage. On the whole a partially shaded but exposed and well-ventilated position seems to suit it best. As a rule, however, excellent results may be obtained by making two main sowings in the year—one the first week in March, and the other in August or September.

Sowing.—To keep up a good supply of plants seeds may be sown at intervals from February to August, in drills about half an inch deep, and afterwards covered with fine soil. The seed beds should be well watered and never allowed to become parched. The earliest sowings should be on a warm sunny border, and should be protected with litter, fern &c. in case of frost. Or the seeds may be sown in shallow boxes on a hotbed or in a greenhouse, and afterwards planted out.

Transplanting.—When two or three inches high, the young plants may be transplanted in showery weather from the seed-beds, or thinned out from the rows, leaving the remaining plants about 6 in. apart. If the soil is suitable the seedlings may be dibbled in all round the edges of the garden walks. They will thus secure a variety of aspect, and at the same time make a very ornamental edging, besides which the leaves are easily picked when required.

General treatment.—This consists chiefly in keeping the weeds between the plants down with the hoe, and liberal waterings during the evening in dry hot weather. Yellow or decaying leaves should be removed and a little dusting of lime and soot around and over the seedlings when transplanted will serve as a check to insect pests. One of the worst of these is the Onion maggot (*Anthomyia ceparum*) which sometimes plays great havoc with roots. Mildew is brought about chiefly by great heat and drought, and may be remedied by watering. Sometimes, however, it is due to rapid changes of temperature accompanied by moisture. The mildewed leaves should be picked off and burned, and a dusting of sulphur over the foliage will check the disease.

Varieties.—There are several of these but the curled and mossy leaved ones should be grown in preference to the plain leaved varieties. *Fern-leaved*, *Moss-Curled*, *Mitchell's Matchless*, and *Covent Garden Garnishing* are among the best. There is a variety called *Hamburg* or *Turnip-rooted* Parsley, the roots of which are cut up and used for flavouring soups, stews &c.

Group IV.—SOLANACEOUS CROPS

POTATO (SOLANUM TUBEROSUM).—It is now upwards of 800 years since the Potato was first introduced to Europe, and although its introduction to England is associated with Sir Walter Raleigh and the State of Virginia in N. America, the wild plant is really a native of Chili and Peru in South America.

A glance at p. 687 will show that there are several species of Solanum, some of them very showy garden plants, but none of them equals *S. tuberosum* in value and importance in qualities now recognised throughout the whole civilised world. There are other tuberous varieties of Solanum, such as *S. Maglia*, *S. Commersoni*, and *S. etuberosum*, which are more or less edible. Efforts have been made, chiefly by Messrs. Sutton of Reading, to hybridise some of these, especially *S. Maglia*, with cultivated forms of the Potato with a view to produce a disease-resisting variety. So far, however, this desirable object has not been attained, and the tubers of *S. Maglia* in some seasons have proved as much subject to disease as those of the ordinary Potato.

Although belonging to a group of plants which contains such poisonous members as the Henbane and Deadly Nightshade, the Potato ranks next to Wheat as an article of human diet, and may be cooked in a variety of ways. The great botanist Linnæus, however, is reputed to have placed the whole order Solanaceæ (p. 687) under a ban for edible purposes, and he never ate a Potato. The Scottish people too are said to have resisted the introduction of the Potato as an article of diet because it was not specifically mentioned in the Bible, and they certainly undertook its cultivation at a later period than the people of England and Ireland.

Propagation.—The Potato is a tuber, and is therefore a stem swollen and modified, primarily to serve as a storehouse for nutriment which has been manufactured by the leaves, and drafted down the stems in the course of the season's growth. The examination of any Potato-plant in the growing season will clearly show that all the roots spring from the stems, and from these are given off the tubers. The latter contain several 'eyes' or buds when mature, and from each of these eyes springs a stem bearing leaves, flowers, fruits, and seeds in due course when the tuber is planted.

Cutting the tubers.—If the Potato-tuber is cut into pieces and each piece contains an eye, it is sufficient to produce a perfect plant with tubers in the course of the season. Some gardeners favour cutting the tubers into pieces before planting, while others do not, on the score that the cut surface may more readily be attacked by disease (see p. 1136). There is little or nothing in support of this argument, especially if the cut portions of the tubers, or 'sets' as they are called, are allowed to dry before planting. On the other hand experiments have proved that a portion of a tuber with a good strong eye or bud will yield as many good Potatoes as an uncut one. And there is no reason why it should not, when it is remembered that all the tubers are the direct result of the action of the leaves as detailed at p. 84, and not of the tuber which has been planted. In fact the latter soon loses its plumpness, and becomes a sticky mass. The reserve food it contains undergoes a chemical change in the soil and is absorbed by the sprouting stem until the latter can develop new roots of its own, to supply nourishment from the soil in the same way as other roots.

The great ease with which the Potato is increased by almost any portion of the tuber with an eye is seen when even the parings of the tubers have been planted on suitable soil.

Preparing the 'sets.'—The tubers used for raising annual Potato crops are usually the small but healthy ones unsuitable for cooking. They are commonly known as 'seed' Potatoes, but the real seeds of course are contained only in the green fruits, known in many parts as

'Potato Apples' from their general resemblance to small green Apples. Whether the skins are green or not is of no great consequence, but any tubers showing signs of rottenness or disease should be burned or given to the pigs. Perhaps it is not wise even to do the latter, as the dormant spores of the Potato disease may ultimately reach soil, and burning is certainly safer always.

Early in the year it is a good practice to select the best and healthiest tubers, and stand them on end in shallow boxes. They may then be placed in a cool, airy, and lightsome place free from frost. In a short time the eyes or buds will begin to sprout. All sprouts, however, except two of the strongest and best at the upper end should be removed, on the principles that govern pruning, disbudding and thinning out, so that those left may become stronger.

Raising Potatoes from seed.—The berries or Potato Apples are the real fruits of the Potato plant. They are very similar in structure to a Tomato, and each berry may contain from 100 to 300 seeds. To obtain tubers from these is a very slow process, and one calculated to try the patience of an amateur, especially as the results may after all be valueless. Perhaps one Potato out of 1000 seedlings would be worth cultivation as a superior variety. The seeds are sown thinly in light rich sandy soil in spring, preferably in frames, and the plants are attended to in the usual way, in being pricked out, watered &c. At the end of the first season small tubers are formed. These are lifted and carefully stored until planting time the following season. About the third or fourth season of cultivation in this way the tubers assume their characteristic shape, and may be seriously tested for flavour and quality. Although a tedious process, it is the only way to obtain new varieties. The object raisers always have in view is to produce a Potato which will be not only richer in flavour and superior in cropping qualities to existing varieties, but also hardier and capable of resisting disease.

Soil.—Ordinary good garden soils of a light and rather dry nature and thoroughly well drained will produce good crops of Potatoes. The ideal soil, however, is a rich light loam overlying limestone. It should always be in a state of good cultivation, and may be deeply dug or trenched during the autumn or winter months, but should not be heavily dressed with farmyard manure. If not required for other crops the soil will be greatly improved by being ridged up and exposed to the action of rain, frost, and snow &c.

Planting in frames.—When an extra crop of Potatoes is required, the 'sets' prepared as described above may be planted in frames in January, in light rich soil, the tubers being at least 9–12 in. apart in the rows, the latter being about 1–2 ft. from each other. Attention must be given to ventilation and light, and the coverings should always be removed in mild and favourable weather.

Planting out of doors.—Early Potatoes may be planted out of doors from the beginning of February according to the state of the weather and the locality. A warm sheltered position facing south is best. When the leaves appear above the soil, it would be advisable to have some dry litter or bracken fern handy between the rows in the event of frost. Potato-leaves are very sensitive to frost, and many an early crop has been spoiled through the want of a slight protection of the foliage. The mid-season and main-crop varieties may be planted from the middle to the end of March in the southern counties, say from St. Patrick's Day, March 17, to Lady Day, March 25, both well-known dates and easily remembered. North of the Thames Valley, except on the milder parts of the western coasts, late varieties may be planted up to the end of April. Potatoes planted at a later period than April have scarcely time to become fully matured by the autumn, except in the south, and early varieties should only be planted then.

Winter Potatoes.—Where new Potatoes are required about Christmas time they are obtained as follows. Tubers are kept back in a cool, dry, airy place until about the middle of July. They are then planted in light rich soil in an old hot-bed or cold frame in rows 12–15 in. apart. each set being about 8 or 9 in. apart in the rows. There is no need to cover the crop until about September, but they should have as much light and air as possible. When the stalks are well above the soil, they may be mulched or ridged up with light rich soil, and if dry may receive an occasional watering. Towards the ripening stage water must be withheld.

and on fine bright days plenty of air may be given during the daytime.

Distance of the rows &c.—The rows if possible should run north and south out of doors, as both plants and soil thus obtain the greatest amount of light and heat during the day. For the early kinds and those forming comparatively small tops a distance of 20 inches between the rows will be sufficient. But for larger and more vigorous maincrop varieties 24 to 30 inches will not be too much, and even 3 ft. may be allowed where soils are known to produce exceptionally fine crops.

The ground having been properly prepared, rows or drills about 6 in. deep may be drawn to a line with a hoe, and in these the cut or whole tubers or 'sets' may be placed from 10 to 15 inches apart according to the variety. The soil is then drawn over the 'sets,' and if necessary the rows may be marked with a stick or large label bearing the name of the variety, date of planting &c. at one end.

Nothing is gained by too close planting, except a mass of small tubers and a predisposition to disease among the matted and ill-ventilated foliage.

At the time of planting the drills may receive a fairly heavy dusting of lime and soot as a preventive against slugs, wireworms &c.

Potatoes are usually grown in plots by themselves, but occasionally the space between the rows may be seen cropped with other vegetables such as Savoys, Brussels Sprouts, Kale, and other crops that are not fit for use until after the Potatoes are dug. It is by no means a bad plan thus to intercrop Potatoes, but the rows of the latter should certainly be not less than 2½ ft. apart, and if 3 ft. apart so much the better. Carrots, Parsnips, Turnips &c. might thus be grown in between in very small gardens to save time. A variety of crops like this on the soil improves its texture, but the principles of the rotation of crops (p. 1104) should always be borne in mind, so that as great a change of crop as possible is secured each season. The great advantage to the Potato crop by this system lies in the fact that the rows are usually much farther apart than they otherwise would be, and the plants thus secure more light and air.

Manures.—Potato ground is usually more or less heavily dressed with stable manure, but many excellent gardeners have come to the conclusion that better and cleaner Potatoes are obtained from soil which has been dressed with artificial manures. Where stable manure is used it should at least be applied to the ground the preceding autumn or winter, and not shortly before the Potatoes are planted. When applied at the latter period and a wet season follows, the Potato disease (see p. 1136) is likely to be more or less in evidence. Where artificial manures, however, are used in conjunction with good cultivation generally, the Potatoes usually are clean-skinned and free from disease.

The following manures have been recommended as giving good results, viz.:—

5 parts *superphosphate of lime*
2 parts *sulphate of ammonia*
3 parts *kainit*

strewn over the ground at the rate of 3 or 4 ozs. per yard before the drills are drawn. Guano or muriate of potash may be also used instead of sulphate of ammonia and kainit, but great care must be exercised in using the muriate of potash, as an overdose is likely to be more injurious than useful. Half a hundredweight of it is quite sufficient to mix with 2½ cwt. of superphosphate.

General treatment.—In the case of the early crops, as soon as the tops are well above the surface, the soil should be drawn up on each side with the hoe. This will protect the tops from the frost a good deal and at the same time destroy the weeds and ward off heavy rains from the centre. As the tops become vigorous, the maincrop varieties have the soil pulled up to them in the same way, thus leaving a distinct furrow between the ridges. In this furrow the crops mentioned above may be planted if necessary.

Digging Potatoes.—When the stems and leaves turn yellow and begin to wither it is a sure sign that the tubers have reached the mature stage. Digging may commence at once, and the tubers be transferred to a dark dry cool and airy place free from frost during the winter months. They should be spread out as much as possible and not piled in great heaps, as they are likely to heat and become useless. Small conical heaps resting on bracken, dry litter &c. keep well. Any signs of sprouting after the new year should be promptly checked by rubbing out the shoots, and it is wise to overhaul the Potatoes occasionally for this very purpose.

Diseases.—The most dangerous disease of the Potato is that known as *Phytophthora infestans.* This is a parasitic fungus which finds a congenial home on the Potato-plant and utterly ruins it. When a spore settles on a leaf, especially if damp or wet, its root-like portion or 'mycelium' pierces the skin and branches about among the cells beneath, absorbing their contents. In due course it sends up on the surface, usually through the small pores or stomata (see p. 88), slender branching stems each ending in a roundish bag-like structure which is full of new spores. When fully ripe these little boxes or 'conidia,' as they are called, burst, and their contents are scattered in all directions by the wind. These spores undergo various changes but are capable of retaining their vitality for several years until they fall upon a congenial spot. It was through their agency that the great famine was produced in Ireland in 1845, although their nature and life history were not understood till many years afterwards when they were discovered by the well-known mycologist Mr. Worthington G. Smith. The only evidences of this virulent disease noticeable with the naked eye are the brownish streaks and blotches on the stems, leaves, and tubers. A microscope is required to see the branches, spore cases &c.

Once this disease takes a firm hold upon a crop it is almost impossible to save the plants, and the only thing that can be done is to prevent the disease spreading. Spraying the plants with Bordeaux mixture (sulphate of copper) is a preventive against spreading the disease, but seems to be in no way capable of lessening it, once it has taken hold. Indeed, according to Mr. A. W. Sutton of Reading, who conducted some experiments with spraying, there is very little difference between a plot of sprayed and unsprayed Potatoes. Two plots which had been experimented upon produced the following results. The one which had been sprayed 3 times in the season bore 3 cwt. 1 qr. 25 lbs. of Potatoes; the other, which had not been sprayed at all, 3 cwt. 1 qr. 4 lbs.—that is 21 lbs. less than the other. 'Strange to say,' continues Mr. Sutton, 'the quantity of diseased tubers was precisely the same in both plots, viz. 4 lbs. It is therefore a question whether the additional weight per acre would compensate the grower for the somewhat laborious task of spraying his crop three times during the growing period.'

Among other remedies or rather preventives against the Potato disease are the Rotation of Crops (p. 1104), not too thick planting, light well-drained and well-tilled soil, the application of artificial instead of farmyard manures (p. 74), and the complete burning of the decaying stems, diseased tubers and leaves after the Potatoes have been lifted.

Other enemies of the Potato are wireworms, aphides, and various caterpillars, but these may be kept in check by dusting the rows and plants with lime and soot at the time of planting, and afterwards when the tops are wet with dew.

VARIETIES OF POTATOES

Potatoes are usually classed as 'kidney' or 'round,' according to shape, but there are now so many intermediate forms between those recognised as true 'kidneys' and true 'rounds' that the distinction is practically worthless. Indeed forms of the two groups often get hopelessly mixed at exhibitions and are passed over by connoisseurs with a shrug of the shoulders.

The varieties also are extremely numerous, and new names are added each year, but it is very rarely one of them proves of sufficient value to become generally cultivated like some of the varieties which experience has proved to be worth a place in the garden.

In selecting 'seed' Potatoes, it may be advisable to state that a change of seed is a good plan. Many gardeners save their own seed, and produce crops from their own stock for several years. By-and-by, however, they do not bear so well and become more or less subject to disease, although the cultivation may be perfect in every detail. It is then advisable to obtain new stock from a different part of the country, and all the old vigour will be re-established.

The following varieties are among the best grown:—

Myatt's Prolific Ashleaf.—An excellent kidney variety, very prolific, with good quality and flavour.

Veitch's Improved Ashleaf.—A heavy cropper, fine flavour, and good for frames or early crops.

Beauty of Hebron.—An early and very heavy cropper, with a tinge of pink round the eyes.

Early Puritan.—A fine American variety considered superior to *Early Rose* or *Beauty of Hebron.* It crops heavily, and the tubers cook beautifully white and floury.

English Beauty.—This has roundish tubers, is a medium grower, and a good cropper on most soils. It matures early and keeps well.

Imperator.—This is a very vigorous growing round variety, suitable for main crops. It is very free and requires a little more space between the rows than most varieties.

Jeannie Deans.—This is a flattish-round, second early Potato of very fine flavour and quality. It crops heavily.

Sutton's A 1.—A distinct round white-fleshed Potato suitable for early crops in frames. Good quality.

Magnum Bonum.—This is probably the best known Potato in cultivation. It is an excellent maincrop variety, and very prolific.

Reading Hero.—This is a seedling from *Magnum Bonum* and *Paterson's Victoria.* It has round tubers of excellent flavour and quality, and is a fine maincrop Potato.

Ringleader.—An early kidney Potato of good quality. The tubers are oblong and white-fleshed, and may be dug in June from a south border.

Schoolmaster.—This is a very heavy cropper, but has a very rough skin. Maincrop.

Snowdrop.—A handsome Potato with shallow eyes and clean skin. It has a fine flavour, and cooks white and floury.

The Bruce.—A first-class maincrop variety, and a very heavy cropper.

Up-to-Date. — A choice maincrop variety, producing heavy crops, and keeps well. It is a good Potato for light soils, but is rather soapy on heavy ones.

Vicar of Laleham.—A handsome and distinct Potato with roundish purple-skinned tubers, and a beautiful white floury flesh when cooked. It is a very heavy cropper suitable for main crops.

Windsor Castle.—A fine variety with oblong tubers. It is a heavy cropper of excellent flavour and quality.

TOMATO (Solanum Lycopersicum). Within the past ten or fifteen years the cultivation of the Tomato has increased by leaps and bounds, and there are now acres and acres of ground covered with glass throughout the country for its production.

The Tomato is a somewhat tender annual, native of S. America, and very closely related to the Potato in structure, the edible portion corresponding to the Potato Apple. If allowed to grow naturally it forms a straggling or prostrate bush with herbaceous stems, but as a rule only the main stem is allowed to develop in a cultivated state.

Although essentially a fruit, the Tomato is usually treated as a vegetable, and is used for making salads, sauces &c. Of late years, however, owing to the beauty, size, flavour, and attractiveness of many kinds, it is being regarded with increasing favour as a dessert fruit. The smaller round and perfectly smooth varieties are most in favour, as are also the miniature varieties known as the Currant, Cherry, and Pear-shaped Tomatoes.

Outdoor culture.—Although mostly grown under glass in the British Islands, the Tomato will ripen well out of doors in hot dry seasons like that of the past year (1899). In cold wet seasons, however, it is practically waste of time to grow Tomatoes on a large scale in the open air, except perhaps in the sunniest parts of the south.

The seeds may be sown in gentle heat in March, in shallow boxes in a compost of light, sandy loam and a little leaf soil. If the seeds are placed about an inch apart and slightly covered with soil, the young plants will have plenty of room to develop and become sturdy before they need be disturbed. If sown thickly, the seedlings must be pricked out into other boxes, or singly into small pots as soon as ever the first pair of true leaves have been developed after the oblong seed leaves.

Soil.—On the whole a fairly rich and sandy loam with good drainage is best for Tomatoes. But any ordinary soil not saturated with stable manure will grow good Tomatoes. Indeed last season I had excellent results from a soil consisting chiefly of ashes and the old soil in which Pelargoniums had been potted. The trusses bore from 12 to 24 fruits each, but this was in a great measure due to the care taken in fertilising the flowers on bright mornings. The only stimulant the plants got was a dressing or mulching of fresh soil when the roots began to appear on the surface. Notwithstanding this experience a fairly rich sandy loam may be regarded as the best soil for Tomatoes.

Watering &c.—Tomatoes do not like too much wet at the roots, but the soil should never be allowed to get absolutely dry. When watering, neither the foliage nor stems should be wet, simply the soil, and if this is in a fine powdery condition, water is best applied with a rosed water-pot, so as to avoid making holes in it, and exposing the roots to the air unnecessarily.

Time to plant out, position, tying &c. It is scarcely safe to plant Tomatoes out until the beginning of June, although in mild seasons and in the south this may be done somewhat earlier. If grown as single stems or cordons, the plants should be at least 1 ft. apart, but more space may be given. A warm sunny and sheltered position facing south, away from trees and shrubs, is best, as too much sun and air cannot be given to bring the fruits to maturity as quickly as possible. The plants may be grown against south walls, or in the open ground, but each one should be secured to a stout stake with a piece of raffia or string, several ties being necessary before the end of the season.

For outdoor cultivation Tomatoes may be grown with two stems to every plant, but then they should be at least 15 in. apart in the rows, and the latter should be 2½-3 ft. away from each other, so as to allow space for tying, or for raising a row of Lettuce, French Beans, or other greenstuff between.

Pinching out side shoots.—As most gardeners prefer the single stem system as giving the best and quickest results, it follows that all the side shoots, or 'laterals' as they are generally termed, should be pinched out as soon as they appear. In fact this operation must be performed frequently during the season, at least once a week, so that all the vigour of the plant is thrown into the main stem for the earlier production of flower trusses. If the side shoots are allowed to remain, the plants soon become a tangled mass of sappy growths, and very few flowers and consequently few fruits are developed.

Fertilising the flowers.—It may seem paradoxical to state that the best time to obtain a heavy crop of Tomatoes is when the plants are in bloom. Such, however, is the case. Bees and other insects are not fond of Tomato flowers; at least I have never observed any searching them for honey. The pistils or fruit carpels are therefore more or less dependent on the wind for having the pollen dust blown on to their sticky surface or stigma, to ripen the ovules in the ovary (see p. 24). This is the reason why good growers like to have a thorough circulation of air when Tomatoes are grown in glass houses.

As one can never be sure, however, that the pollen will find its proper resting place by means of wind, it is far safer to attend to the fertilisation of the flowers personally. Many gardeners smartly slap the stems, or trellises, or stakes, or whatever the plants are attached to, about the middle of every day, so as to cause the pollen to be distributed in the atmosphere and thus blown on to the stigma. Bright sunny mornings are always best for this purpose.

A better and surer method of fertilising the flowers is by means of a rabbit's tail or any piece of soft down or fur, either in the hand or attached to a stick. With this each truss of flowers is gently disturbed, rubbing the fur over the anthers and thus securing the distribution of the pollen, much in the same way as the silky bodies of bees do when fertilising other flowers. This method of fertilising Tomato flowers may take a trifle longer than tapping the plants, but it has a far heavier crop of fruit ultimately to recommend its adoption.

Trimming the leaves.—It is a very common practice with many to not only mutilate the leaves by cutting off the tops, but sometimes remove them almost entirely from the plants before the fruits are anything like ripe. A reference to p. 84 will show that the leaves have very important functions to perform in regard to manufacturing the food of plants, and if these functions are interfered with seriously the plant and its fruits suffer in proportion. Detaching or severely cutting the leaves of Tomato plants usually results in a crop of laterals or shoots from the axils of the old leaves. This is merely an attempt on the part of the plant to develop its natural food-producers, and until they are formed the work of ripening is either retarded or at a standstill.

Nothing can be said against cutting out leaves here and there as needed to admit light and air to the plants, and even cutting the tips off occasionally may be tolerated. But, on the whole, I do not recommend the wholesale mutilation of the foliage, leaving almost bare stems and unripened fruits. It is a mistake to assume that the leaves absorb nourishment that would be better utilised in ripening and producing the fruit. The real fact is that once developed they grow no larger, and their only function is to produce nourishing food wholly and solely for the production and ripening of the fruit and seeds.

Culture under glass.—This is exactly the same as detailed above, except that earlier crops can be produced by sowing seeds at an earlier date, and later crops, right into winter, by sowing seeds at a later period, or by rooting cuttings of the side shoots in gentle heat in summer or autumn as required. From May to October, however, no artificial heat whatever is required, but the plants should always have abundance of air.

Diseases &c.—Except in wet and unfavourable seasons, Tomatoes in the open air are rarely affected with disease of any sort. But in greenhouses they are frequently attacked by a fungus called *Cladosporium fulvum* which is similar in nature to the Potato-disease (see p. 1136) and causes deep brown stripes on the stems and blotches on the leaves. The Potato-disease also attacks the Tomato and produces similar results. In Guernsey a peculiar disease, locally known as the 'Sleeping disease,' has of late years become very prevalent. According to Mr. Massee of Kew, 'the plants are attacked while quite young, but the outward evidence of the disease does not usually manifest itself until the plant is full grown, or even before the fruit is set. The first indication that a plant is diseased is shown by the drooping of the leaves, which increases day by day, often accompanied by discoloration.' The disease is caused by a minute fungus called *Fusarium Lycopersici*, which in the course of its life history passes into various stages, producing numerous microscopic spores, each one of which is capable of infecting a plant and producing thousands of others in a season.

Remedies.—For these fungoid diseases spraying is practically of no use, and the best and safest remedy is to carefully lift the diseased plants and burn them. Do not cut diseased plants with a knife that is used for trimming the healthy plants, and shake the diseased ones as little as possible in removing, as the spores are readily wafted from point to point by the slightest current of air. As the spores rest in the soil, it is a good plan to saturate it with boiling water before planting afresh. Lime and soot may also be sprinkled over and thoroughly mixed with it, especially if there have been any attacks from wireworms or eel worms, which sometimes cause much mischief.

The soil should never be mulched with rank stable manure, as this is frequently the cause of setting up a fungus disease which attacks the fruit just as it is ripening, causing a round blackish blotch at the apex, or around the point where the small pin-like pistil was attached. The refuse of old mushroom beds however makes a very good mulch and may be used without much fear.

On the whole, abundance of air, clean well-drained soil, and a dry atmosphere, together with proper watering, tying, and pinching out of side shoots, are the best preventives against diseased Tomatoes.

VARIETIES OF TOMATOES

There are some two or three hundred if not more so-called varieties of Tomatoes now known, and I have had opportunities of seeing most of them growing and fruiting. Each year there are new names added to the list, but sad to say the varieties they represent seem to be very similar to, if not identical with, those already existing. The following have been proved excellent for general cultivation; but there are others as yet without names that appear to be quite as good, if not indeed better.

RED VARIETIES

Chemin Rouge.—A compact variety with smooth bright red medium-sized fruits of excellent flavour.

Chiswick Dessert.—Fruit small, round, smooth, bright red, fine flavour, good for dessert.

Challenger.—Fruit medium, round, smooth, solid and heavy. A fine variety.

Comet. —Fruit medium, round, smooth, deep red, good flavour.

Conference.—Fruit medium, bright red, round and smooth, excellent flavour.

Duke of York.—Fruit large, brilliant red, smooth, round, heavy, and well-flavoured.

Frogmore Selected.—Fruit large,

smooth, deep scarlet, solid, highly flavoured.

Ham Green Favourite.—Fruit large, smooth, deep red, solid, and well-flavoured.

Laxton's Open Air.—This is an improved form of the old red Tomato with ribbed fruits. It is excellent for growing in the open air.

Neild's Seedling. — Fruit medium, round, smooth, deep red, good flavour.

Perfection.—This is a well-known and popular variety. Fruit large, smooth, round, bright red, finely flavoured.

Trophy.—This is a very large and nearly smooth-fruited variety, and bears heavy crops.

Young's Eclipse. — Fruit medium, bright red, round, smooth, with a fine flavour.

YELLOW VARIETIES

Although an inexplicable prejudice exists against yellow-fruited Tomatoes, it is gradually giving way, and each year the yellow varieties find their way into fresh gardens. Messrs. Sutton and Sons of Reading have devoted a good deal of attention to raising yellow Tomatoes, and the following are some of the best varieties:—

Golden Nugget.—Fruit small, bright golden-yellow, round, smooth, 8-12 in a cluster, fine flavour.

Golden Queen.—Fruit large, slightly ribbed, yellow, very good cropper.

Golden Perfection.—Like the red variety of the same name, but yellow in colour.

Prince of Wales.—Fruit small, round, weighing about a dozen to the pound, golden-yellow, fine flavour.

Sunbeam. — Fruit roundish oblong, smooth, rich transparent amber colour, excellent flavour.

SMALL-FRUITED VARIETIES

These may be grown like the others or as bushes. In pots 5-6 in. across they are very effective and ornamental, when the points of the shoots are pinched out to make the plants bushy. They are excellent for dessert. The following varieties are best known:—

Currant Tomato (*Solanum racemiflorum*).—A very ornamental variety with drooping racemes or clusters of bright red Currant-like fruits. I saw a plant of this last year which had been allowed to grow wild. At the end of the season its branches covered 21 square yards, and the main stem was rather thicker than a man's wrist. There were thousands of fruits borne on the plant.

Cherry Tomato. — This is a more sturdy growing plant, about 4 ft. high, with stoutish much-branched stems and scarlet fruits, each about 1 inch in diameter.

Pear-shaped or **Fig Tomato.**—This is a vigorous variety with clusters of scarlet Pear-shaped fruits about 2 in. long.

The above varieties are readily crossed, and it is easy to obtain intermediate forms from the seedlings. The *Currant Tomato* being very prolific, usually having from 12 to 20 fruits in a truss, may be well worth crossing with the larger but less prolific kinds.

Group V.—COMPOSITE CROPS

JERUSALEM ARTICHOKE (HELIANTHUS TUBEROSUS). — This well-known plant belongs to the same genus as the Common Sunflower, *H. annuus* (see p. 515), and very much resembles that plant in appearance. It is a native of N. America, with tall deciduous roughish hairy stems, which die down every winter, leaving numerous Potato-like white or purplish tubers in the ground. The flowers are very rarely produced in the British Islands.

Soil.—The Jerusalem Artichoke grows well in any ordinary garden soil, and in any out-of-the-way place. It likes plenty of sun, and the better the soil the richer the yield of tubers every autumn.

Planting. — This is usually done about February and March, the small tubers saved from the previous season being placed about 1 ft. apart. They require no further attention until digging time, usually about November, when the stems and leaves have completely withered.

The tubers may be cooked like Potatoes—boiled, baked, roasted &c., and are much appreciated by some but not by others.

As already mentioned above, there are two varieties of the Jerusalem Artichoke, one with white tubers, the other with purplish ones.

GLOBE ARTICHOKE (Cynara Scolymus). — Although belonging to the same natural order (*Compositæ*, p. 492) as the Jerusalem Artichoke, this differs considerably in appearance from that plant. It is a native of Barbary and S. Europe, and really a perennial by nature. It grows 3–4 ft. high, having straight channelled stems, large pinnatifid leaves about 3 ft. long, whitish-green above, very downy or cottony beneath. The heads of blue florets are covered with the fleshy overlapping scales of the involucre, and it is for these fleshy scales, and the top of the receptacle to which they are attached, that the plants are cultivated.

Soil. — The Globe Artichoke enjoys a rich well-drained sandy loam in open sunny and sheltered places. The ground may be well manured and dug or trenched as required in the winter months so as to be in good condition by spring. During the summer months the plants like plenty of moisture at the roots, but the soil should be kept dry during the winter months.

Propagation. — Suckers are usually employed to increase the stock. They spring up all round the base of the old plant, and are detached about March or April, each sucker having as many good roots as possible attached and also a portion of the old plant called a 'heel.' The better to obtain these the soil around the suckers may be removed. A few of the best are allowed to remain on the old plant to produce flower-heads during the early summer season—in May and June.

The suckers may be planted 2–3 ft. apart, in rows or in triangular clumps, the clumps being 3–4 ft. apart, the plants in the clumps being 9–12 in. apart, forming the points of an equilateral triangle. They should be planted firmly but not too deep, say about 4 inches, and afterwards well watered. Until well established the transplanted suckers should be shaded from the sun with pots, boxes, bracken fronds, or anything handy. In the summer or autumn they will produce edible heads. As the plants are not so good or vigorous after two or three years' growth, they may be destroyed, fresh ones having been of course prepared from suckers to take their place.

Seed-sowing.—Globe Artichokes may be raised from seeds, but there is a danger of obtaining inferior varieties in this way. The seeds may be sown in gentle heat in February or March, the seedlings being pricked out and hardened off, so as to be ready for planting out at the end of May or beginning of June. Thus treated they may produce edible heads in autumn.

Seeds may also be sown out of doors in April or May in light rich soil in warm situations, but the plants will not produce heads until the following summer.

Cutting. — The heads of the Globe Artichoke if allowed to develop flowers are useless for culinary purposes. They should therefore be cut before the upper scales of the involucre begin to separate from each other, and while they are fresh and tender. When cutting the heads, the stems also may be cut down close to the surface of the soil. This operation will induce new suckers to spring up from the base, and by thinning out all but a few of the strongest, a later crop of edible bracts will be produced.

General treatment, Protection &c.— This consists in keeping the soil free of weeds, giving water in very hot dry weather, and cutting down the stems to the ground after the heads have been gathered for use. On the approach of frost, in northern parts of the country the plants should be protected all round with litter, and the soil may also receive a good coating of manure. The following spring when growth commences the manure may be dug into the soil. In the milder southern parts, the plants will stand an ordinary winter very well without protection. In the event of severe weather, however, it is safer to cover the crowns with litter or dry leaves.

Varieties.—There are several of these, but the following are among the best for cultivation in the British Islands, viz. the *Green Globe* and the *Purple Globe*.

CHARDS. — These are the whitened hearts or centres of the Globe Artichoke plants. Early in July the stems are cut down to about 6 inches from the ground. A few days afterwards they receive a good watering, and this is repeated once or twice a week until about September, according to the state of the weather. About the end of September, litter or hay &c. is placed around the plants, and the soil is drawn up about them so as to exclude light. In about 6 weeks' time the growths will be sufficiently blanched for use, and are by some preferred to blanched Cardoons.

CARDOON (Cynara Cardunculus). The Cardoon belongs to the same genus as the Globe Artichoke and is considered by some to be a form of the same species. It is a perennial plant, native of the Mediterranean region, and in general appearance resembles the Globe Artichoke. Its stems are channelled and whitish, and the leaves are large and pinnately divided, grayish-green above, white beneath, often furnished with brown or yellow spines ¼–½ in. long at the angle of each division.

Cardoons are cultivated for the very fleshy leaf stalks or ribs, which when blanched and properly cooked are much appreciated by many.

Culture and Propagation.—Cardoons are always raised from seeds. These are sown about the middle to the end of April in northern parts of the kingdom, and a month or so later in the southern parts, in trenches about 1 ft. deep, 18 in. wide, and about 4 feet apart, made as in the case of Celery (see p. 1130). About 3 seeds are sown together in a patch of soil which has been broken up at the bottom of the trench and well manured. Each patch of seeds should be about a yard apart, although some growers allow only half this distance. The seeds are covered with about an inch of soil, and when the seedlings are well above the soil, say 3 or 4 inches, the two weakest plants in each patch may be pulled up, leaving the strongest to grow.

When somewhat earlier crops of Cardoons are required it is necessary to sow seeds in gentle heat in a hotbed or warm greenhouse in March. About 4 or 5 seeds may be sown in a 4–5 in. pot, and when the seedlings are well above the soil, all except the strongest should be thinned out. By keeping the selected plants close to the glass to obtain plenty of light, they become strong and sturdy, and will be fit for planting out at the end of May or early in June. Plenty of air should always be given when under glass, and also gradually cooler quarters as planting-out time approaches. Watering should also be attended to, so that the plants shall be in no way checked in their growth.

During the summer months the plants should be liberally watered according to the weather, and the ground should be kept clean and free from weeds. A dusting with lime and soot when the seeds are sown and when the young plants appear will check any insect attacks. Crops of Lettuce &c. may be grown on the ground between the trenches during the summer months, up to the end of September.

Blanching and Tying.—About this time (September and October) the plants will be full grown, and quite ready for blanching. The stems are tied together and wrapped round with straw or hay when the weather is fine and dry. The soil may then be brought up on each side as with Celery, leaving just the tops of the leaves appearing In three or four weeks or a little more the stalks will be properly blanched and fit for use.

As the plants are tender, they must be protected with a covering of litter, fern, dry leaves &c. on the approach of frost.

Varieties.—The kind called *Spanish Cardoon* without spines is the one chiefly grown in this country, but there are several others.

LETTUCE (Lactuca sativa).—This well-known and much-esteemed Salad plant belongs to the Composite order (see p. 492). It is a native of India or Central Asia, and has been in cultivation about 350 years, and there are naturally a good many varieties.

Soil. — Any good garden soil, well manured and tilled, and not too heavy in texture, will suit Lettuce. A rich deep sandy loam, however, produces the finest plants.

Time of sowing.—According to the variety Lettuce seeds may be sown at intervals from February to the end of July or August, so as to obtain a succession almost the whole year round. The early sowings are best made in cold frames or old hotbeds. The seed should be sown very thinly either broadcast or in drills, and lightly covered with fine soil, afterwards gently patting it down with a spade or piece of flat board.

It is an excellent and time-saving plan to sow Lettuce with Radishes, either in frames or the open border according to the season, as already mentioned under Radishes at p. 1121. As the latter will be drawn first, the young Lettuces will be ready for planting out a week or two later.

Pricking out &c.—The seedlings may be thinned out about 9–12 in. apart in the rows, which should have a similar distance, or a little more, between them. The young plants thus pulled up may be transplanted in frames if early in the year, or into a prepared bed out of doors in a warm, sunny, and sheltered corner, if the weather permits.

About every 2 or 3 weeks from the middle of March to the middle of August a sowing may be made out of doors, transplanting the seedlings when large enough, as recommended above, selecting dull showery weather if possible for this last operation. It may be stated as a general rule that plants from early and late sowings are best grown on light and rather dry soils in sunny situations, while those for summer use are best in cool and rather damp and partially shaded situations, where they are not so likely to 'bolt,' that is, run to seed prematurely.

When ground is scarce an early crop of Lettuce may be planted between rows of Beetroot, and as the Lettuce will come off the soil before the Beetroot, no harm will be done to the latter, and the extra space will be beneficial later on.

Watering.—During the hot and dry summer months Lettuces require liberal supplies of water, especially if they happen to be grown on light soils incapable of retaining much moisture. If not watered they are almost sure to 'bolt,' and the entire crop may be lost. By frequently stirring the soil between the plants, or giving a mulching of short manure, the soil is kept in a nice cool condition round the roots and excessive evaporation is checked.

Blanching. — When Lettuces are nearly full grown and begin to 'heart,' the inner leaves are whitened by having a strand of raffia tied round the whole plant about halfway up. Many of the best 'Cos' varieties curl the tops of the leaves inwards, thus shielding the centre ones from the light, and naturally blanching them. With such it is scarcely necessary to tie the plants at all.

Insect and other Pests. — Slugs are very fond of Lettuces, and as a precaution against their attacks the soil should be well dusted with lime and soot. Where the Lettuce beds are not too large they may be watered with boiling water a day or two before sowing or planting. This will effectually destroy the slugs, wireworms, or other pests harboured in the soil.

Birds, and especially sparrows, are great marauders in some localities, and the only way to save the young plants from destruction is to cover them with fine-meshed wire guards, or netting stretched on stout stakes, but allowed to droop at the edges to prevent entrance and exit by that means. Thin black—not white—cotton also stretched over the crop will keep off birds. Not seeing the cotton they get entangled in it and become frightened off in consequence.

A good dusting with lime and soot about the plants will also be effective, as the birds do not like the bitter taste of this dressing.

Varieties.—Broadly speaking Lettuces are of two kinds, namely 'Cos' and 'Cabbage.' The Cos varieties are oblong and more or less cylindrical in shape, and are considered to belong to *Lactuca sativa* proper, while the Cabbage varieties, as the name indicates, are low and flat with a Cabbage-like appearance, and are supposed to be a distinct species, *L. capitata.* These are usually best for use in winter.

The varieties useful for general cultivation are:—

Cabbage Lettuces: All the Year Round, Brown Dutch, Commodore Nutt, Hammersmith Hardy Green, Neapolitan, and Tom Thumb.

Cos Lettuces: Paris White, Paris Green, Giant Cos, Brown or Bath Cos, London White, and Leviathan.

ENDIVE (CICHORIUM ENDIVIA). — This excellent salad plant belongs to the order Compositæ (see p. 492), and is a native of the East Indies. It has a spreading rosette of smooth, lobed, deeply cut and crisped leaves, which in a blanched state are highly valued as a salading.

Soil.—Endive flourishes in the same soil and situations as Lettuce—that is, in any good and fairly light and rich garden soil, and an open situation. Endive, however, is a more hardy plant than Lettuce, and is valuable for late autumn and winter use.

Sowing and Transplanting.— Seeds may be sown thinly at intervals of a month or six weeks from the middle of

May to the middle of August, to keep up a succession, in beds or drills, in the same way as Lettuce. The seedling plants when large enough are pricked out in dull showery weather if possible about 1 ft. apart each way for the Curled varieties, and two or three inches more for the Broad-leaved or Batavian kinds. After firmly planting, the soil should be well watered in dry weather, and a dusting of lime and soot between the rows will be a check to slugs &c. Birds must be kept off by means of wire guards, black cotton, or netting as with Lettuce.

General treatment. — It should also be borne in mind that during the months of June, July, and August, if the weather is very hot and dry, the plants are apt to run to seed prematurely, that is, 'bolt,' unless they have been frequently and liberally watered. The plants raised from seeds sown in August, however, are not so likely to suffer in this way, as the weather gradually becomes cooler, and showers are as a rule more frequent. Beyond attention to these points Endive requires little further care than keeping the surface of the soil well stirred with the hoe and clear of weeds.

Blanching &c.—Unless the leaves of Endive are blanched they are too rank and bitter to the taste to be of any appreciable use as a salad. By blanching, however, the acrid flavour departs, and the foliage then becomes sweet and tender. As the plants do not last long in a good state when blanched, only a small number should be covered as required. It takes from ten to twenty days to properly blanch the foliage.

Blanching is done in various ways. Some simply place a flower-pot over each plant, and exclude the light by placing a piece of slate over the hole in the bottom. Others make a kind of roof over the plants with two flat boards resting against each other by the upper edges, the space at each end being blocked by a slate or piece of board. Endive may also be tied up with a piece of raffia in the same way as Lettuce, but this operation should only be done when the leaves are quite dry. Another good method of blanching is to place a little clean hay or straw over the plants as required, while some gardeners simply place a piece of clean slate actually down on the crowns of the plants when they are in a dry condition.

Winter protection.—Plants that are to stand out during the winter months should be on a warm, dry, and well-drained border facing south. Although in mild winters Endive will live without protection, it is wise to have some hay, litter, or dry fern handy to place over the plants in frosty weather. When required the plants may be blanched as described above.

Where spare frames exist, the plants may be taken up carefully on the approach of bad weather, having the leaves first of all tied round with raffia, and planted close together in light rich soil. They will soon root into this if properly moved, and may be blanched as required. It is waste of time to treat injured plants in this way.

VARIETIES.—There are many of these known, but those most generally cultivated are: the *Green-curled*, *Moss-curled*, *White-curled*, *Imperial White Batavian*, and *Improved Round-leaved Batavian*.

CHICORY (CICHORIUM INTYBUS).—The wild Chicory is a native of Britain and Europe generally. It is closely related to Endive, and belongs to the same order (*Compositæ*, see p. 492). The name is well known in connection with Coffee. The long fleshy roots of the cultivated Chicory plant are cut into pieces, roasted, and ground, and afterwards mixed with Coffee. It is not very largely cultivated in the British Islands, but is attracting greater attention every year.

Soil. — Owing to the deep rooting properties of the plant Chicory likes a deep rich but fairly light soil, well dug and manured the autumn or winter previous to sowing the seeds. It will, however, flourish in any ordinary good garden soil, and is very easily grown.

Sowing &c. — Seeds may be sown thinly in shallow drills about April and May. The rows should be 12–15 in. apart, and when the plants are well above the ground they may be thinned out to about 9 in. to 1 ft. apart in the rows. The summer treatment is almost precisely the same as for Lettuce and Endive, namely, attention to stirring the soil and keeping the weeds down. Being a deep-rooted plant Chicory is able to stand drought better than Lettuce or Endive. Still in exceptionally dry seasons the plants should be well watered at intervals.

Blanching and Forcing. — Towards

the end of the year, when the foliage has decayed, the roots may be lifted with a fork as required for use. The old leaves are trimmed and cleaned, but the crowns and roots must not be injured. The roots are planted in light rich sandy soil in a box, leaving the crowns and tops protruding about 1 in. above the surface of the soil. They are then placed in a dark cellar, Mushroom house, or some other place where they will be in perfect darkness and free from frost. They should be well watered if the soil is rather dry, and in about 3 weeks' time blanched leaves 8–9 in. long will have been produced, and will be ready for use. To keep up a supply during the winter and spring months, a number of roots may be lifted about every 10 or 12 days and treated as above. The blanched leaves are highly appreciated in France, where the salad is known as *Barbe-de-Capucin.*

As a green salad the leaves of Chicory are appreciated by some during the summer months. To obtain these the seeds are best sown thickly in beds at intervals of 3 or 4 weeks from April to the end of September or October. The young leaves are picked like Spinach, as they are wanted, or they may be cut with a sickle or knife.

VARIETIES.—The kinds mostly grown in the British Islands are the *Common Chicory* forming the *Barbe-de-Capucin* as above; and *Witloef* or *Large-rooted Brussels Chicory.* The latter has broad leaves and stout midribs, and when blanched forms heads like a long and narrow Cos Lettuce.

Other varieties of Chicory are the *Red Italian*; *Large-rooted* (including the *Brunswick* and *Magdeburg*); the *Variegated Chicory*, and the *Curled-leaved Chicory.*

SALSAFY (TRAGOPOGON PORRIFOLIUS).—A European biennial closely related to Chicory, and like that plant having long fleshy taproots with a rather smooth and dull yellowish skin, and crowned with long, narrow, glaucous-green leaves, down the centre of which runs a whitish line. The plant belongs to the Composite Order (see p. 492), and is popularly known as the 'Vegetable Oyster.'

Culture &c.—Salsafy may be raised from seeds sown in May in light rich soil, and in shallow drills about 1 ft. apart. The seedlings, when large enough, are thinned out to about 6 or 9 in. apart in the rows. The general treatment is the same as for Chicory, that is, attention to weeding, watering, and stirring the soil with the hoe during the summer months.

Storing, Uses &c.—Although Salsafy is generally grown for the sake of its taproots, which are cooked somewhat in the same way as Parsnips, and served in a variety of ways, the young and tender leaves may be used as a salad like those of Chicory.

About the end of October the roots may be lifted with a fork, and stored in dryish soil in the same way as Carrots and Parsnips (see p. 1128).

SCORZONERA (SCORZONERA HISPANICA).—A Spanish perennial closely related to Salsafy, and resembling that plant in having long fleshy taproots, the skin of which, however, is blackish, and not yellow in colour. The leaves also are much broader, being lance-shaped oblong, and pointed at the tips. The young leaves may be used as a salad, and the roots are cooked and served in the same way as those of Salsafy.

Culture &c.—As this is precisely the same as for Salsafy and Chicory it is unnecessary to repeat here the details given immediately preceding for those two vegetables or salads.

Group VI —LILIACEOUS CROPS

ASPARAGUS (ASPARAGUS OFFICINALIS).—The Asparagus is a perennial plant belonging to the Lily Order (see p. 808) and in a wild state is found near the sea coasts in various parts of Europe and Asia, and also the British Islands. As a garden plant it has, of course, been greatly modified by cultivation, and is highly esteemed for its young and fleshy stems.

Soil, Manure &c.—A deep rich sandy loam is the best soil for growing good Asparagus. It should be well dug or trenched, as the roots often penetrate to a depth of 2 or 3 ft. below the surface. Too much manure can scarcely be given to the ground for Asparagus, and whereever the soil is of a stiffish nature it may always be lightened with river sand, road sweepings, old mortar rubbish, and plenty of farmyard manure. Thorough drainage is essential, and when trenching the soil the bottom should therefore always be well broken up. The drainage may be improved if necessary by a layer of brick rubbish, broken clinkers &c. at the bottom of the trench.

Propagation.—Asparagus plants may be raised from seed. The latter are black in colour and triangular in shape, and may be sown thinly—about ½ in. apart—at the end of March or early in April out of doors in drills about 2 in. deep and 1 ft. or 18 in. apart, when the soil is in a dryish and friable condition. The soil is closed over the seeds, and made firm and level by treading, or in the case of large patches a light roller may be used with greater advantage.

Preparing the beds.—If it is intended to produce the crop on the seed-beds—which may be level, or raised, and about 3-5 ft. wide with an alley 2 ft. wide between the beds—the young plants should be thinned out when large enough to handle easily, leaving only the strongest at a distance of about 18 in. between them in the rows. When the stems and feathery foliage become yellow in autumn, they may be cut down to within 2 in. of the ground. The surface of the latter should then be covered with a good layer of well-rotted farmyard manure to serve as a protection against frost, and also to benefit the roots when growth begins again in spring.

The following year the plants are allowed to grow in the same way, keeping the ground free from weeds, cutting the stems down in autumn, and heavily manuring. But it is not wise to begin cutting the shoots until the third year, when the plants will have become well established. If cutting is deferred until the fourth year from raising the seeds, so much the better.

Instead of allowing the plants to come into bearing from the bed in which the seeds were sown, as described above, the seedlings may be allowed to grow the first year with little or no thinning out, according to whether they have been sown thickly or otherwise. After cutting down in autumn and covering with manure, they may rest until the end of March or beginning of April. In the meantime beds 3, 4, or 5 ft. wide, according to taste, should be prepared during the winter months. Where the soil is light, deep, and rich, it is scarcely necessary to make raised beds, although that is the general rule, and a very good one, where the soil is naturally poor and shallow with a cold and sterile subsoil. By having raised beds rich and well-prepared soil may be used, but where this cannot be secured, it is better to leave the culture of Asparagus severely alone.

Planting.—The beds having been prepared and allowed to settle during the winter they will be ready for planting at the end of March or early in April as the crowns are starting into growth. Trenches 4 or 6 in. deep may be cut with a spade ready for the young plants. These are carefully lifted from the seed-bed of the previous year, and the plants are placed in rows about 18 in. from each other. Many excellent growers, however, consider this too near, and recommend as much as 2-2½ ft. between the plants, while others recommend as much as 4 ft. between the clumps every way. By adopting the latter method it is possible to secure other crops of vegetables off the beds until the Asparagus is fit for cutting. French Beans, Lettuce, and Early Potatoes are crops that may with advantage be grown on young Asparagus beds; but it is essential when adopting this method of overcropping to know exactly where the Asparagus plants are located.

Another good way is to make the beds at the lowest level at which the plants are to be placed without the use of trenches. Having placed the crowns at the required distances from each other, the soil may then be placed over them to the proper depth.

During the actual process of planting, the roots should be spread out carefully, and the soil should be drawn over them with the hand and made firm around them until the crown of the plant is about 2 in. beneath the surface of the bed.

It may be remarked that the first row in the bed should be down the centre, the others on each side being equal distances from it. And the first plant in the row should be at least 9 in. from the edge of the bed. Dull showery but mild weather is best for planting.

Mulching.—After planting and making

the soil firm and level, the beds may receive a good mulching of short well-rotted manure, such as the remains of an old Mushroom bed. The plants will grow during the season in the same way as the untransplanted seedlings already described, and in autumn they are cut down and mulched with manure as before recommended. The plants however will not be fit for cutting any sooner than those left in the seed beds, that is about the third, fourth, or even fifth year. After this, with liberal dressings of manure and intelligent treatment generally, the beds may continue to yield good crops annually for 8, 10, or 20 years.

Manure.—Besides the annual heavy dressing of farmyard manure in autumn after the stems and foliage (the latter, by the way, is very useful for decorations) have been cut down, a little chemical manure added in early spring just before growth begins will also be highly beneficial. It is, however, quite unnecessary to give this spring manuring except in the case of old Asparagus beds which have shown signs of having produced their best crops. About 1 lb. of nitrate of soda or sulphate of ammonia to 40 sq. yards will produce good effects. About 6 lbs. of superphosphate of lime mixed with 10–20 lbs. of kainit has also been recommended as an excellent dressing in early spring, lightly pricked into the soil with a fork. In showery weather a slight sprinkling of common salt on the beds is recommended by some growers.

The soil from the alleys between the beds is placed over the crowns every spring, and this gives a good depth for the shoots to push through. The farmyard manure, however, which was placed over the surface in autumn should be carefully forked over, and should there be any hard or caked masses, as is often the case, they should be removed before covering the beds with the soil; otherwise they are apt to prevent the shoots coming through the soil properly, either breaking or bending them.

Cutting Asparagus. — This is an operation requiring some little judgment and care. When plants are first cut, say the third or fourth year from the period of sowing, only two or three shoots should be cut from each stool, allowing the others to develop and manufacture reserve material for the roots during the season. In after years the strongest shoots only may be cut until about the middle or end of June according to season and the locality. But after June all cutting should cease. It is a mistake to cut too heavily, even when there is great temptation to do so, as it is essential that a certain number of stems and leaves should be developed to carry out the natural work of the plants (see article on 'Leaves,' p. 82). If there are no leaves, or not a sufficient number, developed, the roots which have been exhausted in producing the edible stalks are unable to recuperate, and the Asparagus beds are often spoiled in consequence. From the middle of April to the middle of June may be regarded as the season for cutting Asparagus, this time being a few days earlier or later according to season and locality.

The actual cutting requires care. When the shoots are 1–2 in. above ground a very common practice is to work the Asparagus knife down to the base of the stalks through the soil and sever them. But this practice is often accompanied by damage to the young shoots which may be just starting from the roots. An expert will cut the stems easily enough, as the result of much experience, but the novice is almost sure to do a good deal of damage to the young shoots.

A better plan is to have a small heap of rich soil placed over each clump of Asparagus, or the soil may be drawn up over the rows to make ridges. In this way the stalks become longer, and are also blanched the greater portion of their length by being in darkness. When the tops are bursting through the soil, the latter may be carefully removed by the hand exposing the stalks fit for use. These may then be easily detached with the fingers or by means of a sharp knife, and there is no danger of damaging the remaining shoots. The cut shoots vary in length from 4 to 8 in., but it is only the upper and younger fleshy portion that is fit for use when cooked. To obtain the best flavour from Asparagus it should be eaten as soon as possible after cutting, as it deteriorates in flavour by keeping.

VARIETIES.—There are several of these, but the best for general cultivation are *Connover's Colossal*, considered to be the largest and best; *Battersea* or *Giant*, and *Argenteuil*.

ONION (Allium Cepa). — Notwithstanding its pungency and odour, the Onion is one of the most popular and useful crops in the kitchen garden. It belongs to the same order as the Asparagus (*Liliaceæ*), and several of its near relatives have already been described under the genus *Allium* at p. 880 as beautiful flower garden plants. The cultivated Onion, however, is more highly appreciated for its bulbs, which are cooked in various ways and used for many purposes.

Soil, Manure &c.—Onions prefer a light rich and rather sandy well-drained loam, but flourish in any good garden soil which has been well dug or ridged up and heavily manured during the autumn or winter months.

About June and July, as the bulbs are beginning to swell, they may be assisted in the process by dressing the soil with soot. A fine sprinkling of nitrate of soda (see p. 71) or sulphate of ammonia (p. 72) is also useful. Common washing soda as sold by grocers is also an excellent manure for Onions. It may be sprinkled over the soil, after crushing into a powdered state, and then watered in. Where only hard water is available the action of the washing soda will soften it considerably and thus render it more acceptable to the roots. Liquid manure, such as the runnings from stables &c., may be used diluted with clear water during the same period, and is on the whole superior to artificial manure.

Seed-sowing in spring. — When Onions are required for summer or autumn use, seeds are generally sown about the middle to the end of February. The soil is previously forked over, levelled and made firm by treading. Shallow drills, about 1 in. deep and 1 ft. apart, are drawn with the corner of the hoe to a line, and in them the black and flattish seeds are sown as thinly as possible. Before sowing, the soil may be well dusted with lime and soot as a precaution against the maggots of the Onion Fly and other pests, or if not too much trouble the soil may be watered a day or two before with boiling water, which will not only kill the maggots but also the seeds of weeds, which are often a great nuisance to young Onions. In any case seed-sowing is best done when the soil is in a dry and friable condition.

Thinning out &c.—When the young plants are 2 or 3 in. high, they should be thinned out from 4 to 6 in. apart in the rows, any gaps being made good by means of the uprooted plants. Those left may be used for salads. Weeds of course are destroyed at the same time and onwards during the season, the soil between the rows and enlarging bulbs may be stirred from time to time with the small hoe specially used for Onion hoeing. Care, however, should be taken not to draw the soil up round the bulbs.

Harvesting. — From the middle of August to September, when the cylindrical and hollow leaves are turning yellow, the Onions may be pulled up and spread out to dry with their roots facing south. Every day or two it will be necessary to turn them over so that the bulbs may be equally and properly dried. This being accomplished and the withered leaves cut off within a few inches of the bulbs, the latter may be stored in cool airy lofts or cellars, or strung up in the bunches to ceilings.

Seed-sowing in autumn.—From the end of July to the middle of August seeds of Onions may be sown in light dry soil in shallow drills as recommended for the spring sowing above. The seedlings may be thinned out from 4 to 6 in. apart in spring, or better still should be transplanted, as experience seems to prove that not only are better and more shapely bulbs eventually produced, but they also keep in good condition for a longer period than those of plants which have not been transplanted. In the case of large varieties like *Ailsa Craig* and *Giant Rocca* every alternate bulb should be pulled by May or June, so as to leave about a foot between the plants, which are left to mature as the maincrop. Mild showery weather should be chosen for transplanting, and the work should be performed as early as possible so that the plants become well established before the approach of the hot weather. When transplanting some good gardeners cut 2 or 3 in. off the fistular leaves for the following reasons: the injured roots will have less work to perform until established, and perhaps a more important reason is that the leaves when cut will not topple over and tempt the worms to draw them down into the soil, and thus uproot the young plants. This practice, however, is condemned by other good gardeners. The bulbs will be ready for use about the end of July or August, when they may be harvested, dried, and stored in the same way as those from spring-sown seeds.

VARIETIES OF ONIONS

The following are among the best at present known:—

Ailsa Craig. Very large, pale straw-yellow, mild flavour, keeps till March.

Banbury Improved. Large, bright yellow, mild flavour.

Bedfordshire Champion. Brown-skinned, globular, keeps well till May or June.

Blood Red. Bulbs very solid, medium, skin dull or glossy red. Keeps till June.

Brown Globe. Medium, roundish, red-skinned; keeps well.

Brown Spanish (*Strasburg Deptford*). Bulbs medium, flattish, dark red-brown skin, good quality and keeps well.

Cranston's Excelsior. A handsome globe-shaped Onion with yellow skin, good quality, and keeps well till about the end of February.

Danvers's Yellow. An excellent straw-coloured variety; keeps well till May. One of the best for general use.

Giant Zittau. Bulbs large round, with a bright yellow skin; keeps well, often into May and June.

James's Keeping. Bulbs oblong or Pear-shaped, large; keeps well.

Magnum Bonum. Bulbs very large, with a bright straw-yellow skin. Good keeper till May or June.

Nuneham Park. An excellent Onion for general use. It is a form of the White Spanish. Keeps well till May.

Rousham Park Hero. A distinct form of the White Spanish Onion. The bulbs grow very large, with pale straw-yellow skins. Mild flavour; good keeper till May.

Silver-skinned. A good pickling Onion. The seeds should be sown thickly in spring, and the young plants need not be thinned out.

Sutton's A 1. Bulbs very large, flattish, 6-8 in. in diameter, with brownish-yellow skin, excellent quality and keeps till May. Good for spring or autumn sowing.

Sutton's Globe. A handsome round Onion with a mild and delicate flavour. Keeps till June.

Trebons. Bulbs very large, Pear-shaped, yellow-skinned. One of the best for autumn sowing. Keeps till March.

White Globe. Bulbs medium, roundish, remarkably firm and solid, with a silvery skin. Keeps in good condition till May.

White Lisbon. This variety is chiefly useful for sowing in autumn, to produce salading in spring. When full grown the bulbs are large and roundish, but are not much valued in that state.

White Spanish or *Portugal.* An excellent all-round variety, good for general use. Bulbs large flattened, with pale straw-yellow skin. Keeps well till May.

The Tripoli Onions mentioned below are usually recommended for autumn sowing. As a rule when sown in spring the bulbs of most of the varieties do not last beyond Christmas, although some gardeners can keep them until the end of January and into February.

Tripoli, Giant Rocca. Bulb large round, delicately flavoured; skin brown.

Tripoli, Red Globe or *Madeira.* Bulb very large, with a sweet and tender flavour. Skin salmon-pink.

Tripoli, Large White Italian. Bulb large, flattish, mild flavour.

Tripoli, Large Globe. Bulbs large, with silvery skins; mild flavour.

Tripoli, Mammoth, or *White Elephant.* Bulbs 6-7 inches in diameter, with silvery skin; very mild flavour.

Tripoli, White Queen. Bulbs very small roundish, with a silvery white skin. This grows quickly, when sown in March is fit for use in August, and when sown in August is ready for use in March. Excellent for pickling. The seedlings need not be thinned out.

Tripoli, Bassano. This is one of the best of the Tripoli section, having a blood-red colour and a mild flavour.

The following distinct kinds of Onion are not generally cultivated, but are occasionally met with.

Egyptian, Tree, or Bulb-bearing Onion.—This produces a number of small marble-like bulbs on the top of a stem sent up from the bulb. They are excellent for pickling. Offsets are also produced underground, and by these, and those on the stem, the variety is increased.

The Perennial, Tree, or Top Onion is very similar to this, but produces no underground offsets.

The Potato Onion.—This has irregular underground bulbs, which are planted in early spring about 6 in. apart in the rows. The bulb should be just covered with soil. During the period of growth offsets are produced and may be used for increasing the stock the following year. The bulbs are of good flavour, but are not extensively grown.

The Welsh Onion (*Allium fistulosum*). This Onion has no bulbs but long fibrous roots, and is cultivated sometimes for the leaves. There is a red form and a green one. Seeds may be sown in spring—from March to April—as with ordinary Onions, or the rootstocks may be divided at the same period. The leaves are usually fit for cutting about 8 months after the date of sowing, and may be used for flavouring soups &c.

LEEK (Allium Porrum).—Like the Onion the Leek is a hardy biennial plant, and is believed to be a native of Switzerland. It is chiefly valued for the lower blanched portion of the bulb-like stem or rather the leaves, the real stem being the flattish or slightly conical plate at the base from the upper side of which the leaves spring.

Culture and Propagation.—The Leek requires to be grown in a rich and light loamy soil deeply dug and well manured as for an Onion crop. Seeds may be sown at the beginning and also the end of March, a few days earlier or later according to the weather and locality, when the soil is in a good friable condition.

To obtain the best results Leeks should always be transplanted when 4–6 in. high in mild showery weather. The plants should be about 5 or 6 in. apart in rows 12–18 in. apart, and may be planted deeply, just leaving the tops of the leaves above the soil. It is a good plan also to plant them in trenches, afterwards drawing the soil up to and around them on each side when they have made good growth. In this way the stems are blanched, and will be ready for use from the autumn to spring.

Another method is to make holes 4–6 in. deep and place a plant in the centre of each. During the season the action of the rain and weather gradually breaks down the fine soil left on the edge of the holes and thus automatically assists in blanching. The holes are also useful in holding supplies of rain water, liquid manure &c.

A modification of this plan is to make trenches 9–12 in. wide, somewhat in the same way as mentioned for Celery (p. 1130). The bottom of the trenches may receive a coating of good manure, and over this a layer of rich soil, so as to leave the trenches about 6–12 in. deep. The young Leeks are then planted out in showery weather, and as the season advances the soil is from time to time drawn around the stems. The trenches are valuable for holding rain water, liquid manure &c.

During the summer months the plants may be frequently and liberally watered, especially if the weather is particularly hot and dry. Liquid manure given about once or twice a week will make a good deal of difference in the size and succulence of the 'stems.'

The soil between the rows should be kept free from weeds. It is possible if desired to take a crop of early Lettuce from between the rows of Leeks, before the latter have made their full growth.

Early Leeks.—Good Leeks are produced from start to finish out of doors. Where, however, an extra early crop is required it may be obtained as follows. Seeds are sown rather thickly soon after New Year's Day in light rich soil on a gentle hotbed. The bed is well watered and kept close until the young plants are above the surface. After this the lights are removed or tilted on all favourable occasions to give the plants as much air as possible. If too thick the seedlings should be thinned out 1–2 in. apart, and they should never lack for water. At the end of March or early in April they will be hardy enough for transplanting to the open ground. They are then carefully lifted and planted in rows as described above, and will be ready for use about July or August.

Varieties.—The following are usually met with in cultivation, some of them, like *The Lyon*, attaining a great size. *Ayton Castle Giant*, *Large Musselburgh*, *Henry's Prize*, *London Flag*, *Renton's Monarch*, and *The Lyon*. Most of these when well grown may be blanched for about 1 ft. from the base. It should, however, be remembered that what often looks magnificent in size on the exhibition table is frequently deficient in cooking qualities. And here a mild protest may be appropriately entered against prizing vegetables too much simply on account of their great size and appearance, and too little for their economic value. Good flavour and quality should always be considered before mere size.

SHALLOT (Allium ascalonicum).—The true Shallot is a perennial plant, native of Palestine. It has a greyish or silvery skin, and is somewhat long and Pear-shaped in outline. The false or Jersey Shallot is the plant generally grown, and is really a small roundish tapering Onion with a deep red-brown skin.

Although closely related to the Onion, the Shallot grows somewhat differently and is usually increased by the offsets or 'cloves' from the old bulbs, instead of seeds. The latter, however, may be sown in the same way as those of Onions (see p. 1148).

Soil, cultivation, &c.—The Shallot likes a light, rich soil, but will grow well in ordinary good garden soil well dug and manured as for Onions and Leeks. Early in March, when the soil is not wet and sticky, the cloves may be planted in shallow drills about 9 to 12 in. apart, allowing about 4 to 6 in. between them in the rows. They should be almost entirely covered with soil, but as a rule the tops are left just sticking above the surface. At the latter end of July the leaves begin to wither. This being a sign that growth is finished for the season, the bulbs may be pulled up, and spread out to dry for a few days, afterwards storing them in a dry and cool airy place. They will keep in good condition for several months and are much valued for pickling and as seasoning or flavouring by cooks, and are considered to be superior to Onions for these purposes.

GARLIC (Allium sativum). — The Garlic is a S. European perennial having irregular-shaped bulbs well known for their strong and highly peculiar flavour. In the warmer southern countries of Europe, however, this flavour is not so intensely developed as it seems to be in cooler and more northern climes.

Culture and Propagation &c.—The Garlic is grown practically in the same way as the Shallot, and is always increased by means of the cloves or offsets from the old bulbs. The cloves are planted in drills or rows like those of the Shallot, but are completely covered with soil to a depth of one or two inches. At the end of February or the beginning of March is the usual time to plant, but when the bulbs are lifted in late summer, another planting may be made so as to produce an earlier crop the following year. After the leaves have withered the bulbs are lifted, dried, and stored in a dry, cool, and airy place like Shallots.

Group VII.—Miscellaneous Crops

BEETROOT (Beta vulgaris). — Although the Beetroot produces tap-roots somewhat resembling the Carrot, Parsnip, and Turnip in shape, it belongs to a different order of plants altogether, namely *Chenopodiaceæ*, the characters of which are briefly given at p. 765. It is a native of Europe, and a biennial by nature. It forms a thick fleshy root the first year in the same way as the Carrot and Turnip, and will produce flowers and seeds the second year if allowed to continue in growth.

Soil.—The Beetroot flourishes in a deep light and fairly rich soil, but dislikes its roots reaching strong manure of any kind. Indeed it may be said that the Parsnips (see p. 1129) and Beetroot require the same soil and treatment. Any manure for the soil on which Beet is to be grown should be given the previous year, and should have grown another crop. The soil is brought into a good condition for producing Beet by digging or trenching the previous winter, and should be in a well-drained state, so that water shall readily pass away from the roots.

To secure the best results Beetroot should be grown in warm, open, and sunny situations, and not under the shade of trees, which interfere with the proper colouring and ripening of the plants.

Seed-sowing.—To secure an early crop the first sowing of Beet may take place about the end of March; the main crop early in May in the south, or the latter end of April in the north.

The seed is sown in shallow drills or rows 1 ft. or 15 in. apart, when the soil is in a good condition. By soaking the seeds for about a day and a night, their germinating powers will be quickened; but this is not an advantage in the case of the first sowing, the seedlings of which are sometimes killed off by frost, although it is in the case of the others.

Where ground is scarce Beetroot may be intercropped between rows of Lettuce and Spinach, and even on young Asparagus beds when the clumps are not too thick.

To check attacks of insects, slugs, caterpillars &c., the drills should be well dusted with lime and soot preparatory to sowing the seed.

Thinning out.—When the young plants have made 3 or 4 leaves, they may be thinned out to 6 or 9 inches apart in the rows, leaving the strongest and healthiest looking plants. Beetroot should not be transplanted, as this injures the main or tap root, and more or less effectually spoils the shape and symmetry of it afterwards. The same may be said of Turnips, Carrots, and Parsnips, which are always thinned out, but not transplanted, to avoid 'fangy' or 'forked' roots.

During the summer months the soil between the plants should be stirred occasionally with the hoe, to keep the weeds down and also lessen evaporation.

Storing the roots.—Although fairly hardy, Beetroot is not improved by being severely frosted. About the end of October, therefore, the roots should be carefully lifted with a fork. If the roots are broken or injured in any way they 'bleed' or lose their coloured juice, and are then useless for cooking. It is also better not to cut the leaves off for the same reason, until the roots are to be cooked, although they may be twisted off by the hand close to the crown. They may be stored in a cool dry and airy shed, packed in dry sand or soil. Or they may be stored out of doors, being arranged in layers between soil, and covered with a little straw, litter, or bracken to ward off heavy rains. The main point in storing is to keep the roots cool, but protected from frost, so that they shall not heat and begin to grow in consequence.

Varieties.—There are many varieties of Beetroot, and not all of them are confined to the kitchen garden. A few forms are useful for the decoration of the flower garden, as may be seen by reference to p. 766. The following are some of the best and most useful cooking varieties:—

Dell's Crimson; Frisby's Excelsior; Nutting's Selected Dwarf Red; Pragnell's Exhibition; Covent Garden Red; Egyptian Turnip-rooted; Veitch's Blood Red; Cheltenham Green-leaf; and Pine-Apple Short-top.

In the case of the *Spinach Beet*, the leaf-stalks are served like Asparagus, and the leaf-blades like Spinach. With the *Silver* or *Seakale Beet*, the leaf-stalks and midribs are cooked like Seakale.

SPINACH (SPINACIA OLERACEA).—The Spinach is a diœcious plant—that is, the male and female flowers are borne on different individuals—and belongs to the same order (Chenopodiaceæ, p. 765) as the Beetroot. In a wild state the leaves are more or less arrow-shaped and pointed, but cultivation has made them broader and rounder, and more fleshy in texture. When cooked they are remarkable for retaining the green colouring in great intensity, although they lose a good deal of their flavour. The words 'round' and 'prickly' applied to Spinach in catalogues have reference not to the leaves, as might be imagined, but to the seeds. The latter, of course, are produced only by the female or pistillate plants. Some seeds are furnished with sharp prickles, while others are round and free from prickles. The Prickly-seeded varieties are usually sown to produce crops in winter and are very hardy; while the Round-seeded varieties are usually sown for summer supplies.

Cultivation &c.—Spinach flourishes in any good garden soil which has been well dug or trenched and manured some time previous to sowing the seed. Open or partially shaded situations are equally suitable in summer for Spinach. More water, however, is required in open situations in hot weather to prevent the plants 'bolting' or running to seed prematurely.

Summer Spinach.—To obtain a good supply of fresh tender leaves during the summer months, seeds of a round or summer variety, such as the *Flanders*, *Victoria Round*, or *Monstrous Viroflay*, may be sown at intervals of 2 or at the most 3 weeks from the middle of February onwards till the middle of July. It is necessary to sow seeds at intervals as recommended during the spring and summer, as the plants are very much inclined to run to seed during that period, and this seeding robs the foliage of its juiciness and tenderness, and also imparts to it a more or less acrid and unpalatable flavour. For summer sowing a cool moist and partially shaded position should be selected if possible, such as between rows of Peas, Gooseberries, Raspberries &c., where they will obtain a little shade from the sun. The last sowing of Summer Spinach will be fit for use up to about the end of October.

It may be mentioned that market gardeners do not often sow Spinach seed after April, chiefly on account of its proclivity to bolt in summer, when so many other things have to be attended to. And in private gardens it is wise not to make larger sowings from April till July than are sufficient to produce the amount required.

Winter Spinach.—From the middle of August to the end of September seeds of a prickly or winter variety, such as *Prickly Long Standing*, may be sown for winter use. In Scotland and the north of England, according to the weather, the earlier date may be taken for sowing seed, but in the south of England and Ireland the work may be deferred until some time in September. One of the points to remember in sowing Spinach for a winter crop is, not to sow too soon, as then the plants are likely to develop too quickly and run to seed before they are required for use. If sown at the right periods, Winter Spinach will continue in use up to May or June, and may then be replaced by the Summer Spinach sown earlier in the year.

Sowing the seed &c.—The seeds for summer and winter crops are sown in the same way. Drills one or two inches deep and about 1 ft. apart are opened to a line with the corner of a hoe. For the earliest and latest crops warm sheltered situations should be chosen, so that the plants will not suffer so much in the case of severe frosts. The seeds are sown thinly, and when the young plants are well above ground they may be thinned out. During the season the hoe may be used to keep the weeds down, and in the event of very hot and dry weather frequent and abundant waterings will be of the greatest benefit.

In market gardens, where space is often a great consideration, Spinach is usually sown in beds 4 or 5 ft. wide in the same way as Radishes. An alley or pathway about a foot wide is left between the beds, so that half the crop may be picked from one side and half from another.

Picking Spinach.—To make a crop last a long time a little care must be exercised in picking the leaves. Only the largest and finest should be picked off carefully, leaving the smaller ones for a future picking. It is a good plan to begin at one end of the row or bed and work to the other in a systematic manner, and not to pick a leaf here and there. Some gardeners cut the leaves—large and small—off with a sharp knife, and then wait for new growths. But this practice is not to be recommended, not only because it seems to be wasteful, but because one has to wait longer for the next crop of leaves.

ORACHE, ORAGE, or MOUNTAIN SPINACH (ATRIPLEX HORTENSIS). This plant belongs to the same group as the ordinary Spinach. It is a hardy annual, native of Tartary, and is recognised by its broad, arrow-shaped somewhat crimped leaves, which are occasionally used as a substitute for those of the ordinary Spinach.

Culture &c.— Seeds may be sown out of doors in rich and well-manured garden soil about the middle of March and again at intervals of a month or six weeks up to September if a succession is required. The seeds are usually sown in drills about 1 in. deep and 2 ft. apart, and when the seedlings are well above the surface of the soil they are best thinned out 12 to 18 inches apart. Little further attention is necessary beyond pinching out the flower-spikes, and a good watering occasionally in hot dry weather. Seeds are freely produced, but should be collected before quite mature, as they are apt to be scattered by the wind when thoroughly ripe.

VARIETIES.—The best known are the *White*, the *Green*, the *Red*, and *Dark Red*. The latter is a handsome-looking plant with deep velvety red or purple stems and leaves, which have recommended its use as a decorative plant in the flower garden. The red colour disappears when cooked.

GOOD KING HENRY (CHENOPODIUM BONUS-HENRICUS). — This is a native perennial plant 2–2½ ft. high, with long-stalked arrow-shaped wavy deep green leaves, rather thick and fleshy in texture, with a frosted appearance on the under surface. It is occasionally cultivated as a pot-herb in lieu of Asparagus, and is known in some parts of the country as 'All-good' and 'Mercury Goosefoot.'

The young shoots should be cut under the ground like Asparagus, and the bark or skin if tough should be stripped off. After washing and cleaning they require to be well boiled, and may be served with melted butter, gravy, meat &c. The young leaves may be used in the same way as Spinach and Orage, but the plants should not be too heavily stripped.

Culture &c. Good King Henry will flourish in ordinary good garden soil, but the deeper and richer the better for producing juicy young shoots. Seeds may be sown out of doors in April and May, and when large enough the young plants may be pricked out into their permanent positions about 1 ft. or 8 in. apart every way, in mild showery weather. Once the plants are established they are easily increased by dividing the stools or clumps about the end of September, or early in spring just as growth is about to begin. From April to July is the period when the plants may be cut from for cooking purposes as a rule. In the autumn a mulching of well-rotted manure may be forked in between the plants, and during the summer months the soil may be kept in good order by hoeing, and a good watering in dry weather.

NEW ZEALAND SPINACH (TETRAGONIA EXPANSA). — From a botanical point of view the plant known as New Zealand Spinach, or the New Zealand Ice plant, belongs to the natural order Ficoideæ (see p. 464), and is widely removed in its structural details from the ordinary Spinach. It is a fairly hardy or half-hardy annual plant with a decumbent or trailing habit, the stems being often 2–3 ft. long and clothed with alternate thick fleshy leaves, 2–4 in. long, and more or less ovate, triangular, or broadly hastate, and peculiarly cold to the touch, even on the hottest day. The young leaves are valued as a substitute for Spinach during the hottest months of the year, when it is often difficult to obtain supplies of the ordinary varieties.

Culture &c.—Seeds may be sown in rather rich light soil in pans or boxes in gentle heat during March, or in the open ground in April and May. Seedlings raised in heat will be ready for transplanting to the open ground about the end of May or beginning of June. They will flourish in ordinary good garden soil, but prefer a rich and light sandy loam. Owing to the trailing nature of the stems a distance of 3 ft. between the plants every way will not be too much, especially in rich soils. The general treatment afterwards consists in keeping the weeds down, and liberal supplies of water during hot and very dry seasons. The leaves when young are pinched off with the thumbnail, and may be cooked like Spinach. A supply of young leaves from the axils of the older ones is kept up during the summer months.

RHUBARB (RHEUM HYBRIDUM). — There are several species of Rheum or Rhubarb described at p. 770 of this work as being ornamental foliage plants for the flower garden. The form cultivated in the kitchen garden is usually known as *Rheum hybridum*, a native of China; but it is possible that other species have also been concerned in producing this well-known vegetable, or 'fruit' as some imagine it to be when under the appearance of tarts, pies, jam &c. The leaf stalks are the portions utilised for cooking purposes.

Seed-sowing. — Although Rhubarb is so easily increased by means of division, some gardeners like to raise a fresh stock of plants from seed. The plants thus obtained are almost sure to vary somewhat from the original variety, upon which they may or may not be an improvement so far as flavour is concerned. The seed may be sown about September when fully ripe in shallow drills about a yard apart, or they may be sown in March and April in the same way. The seeds should be sown very thinly, and the seedlings may afterwards be thinned out 2–3 ft. apart, leaving only the best to grow on. As the plants make long thick and fleshy roots, it is better not to transplant them, but to allow them to grow where the seed has been sown. In two years splendid plants will be produced by this means.

Culture and Propagation.—Rhubarb will grow well in any fairly rich and good garden soil, rather light in texture and well exposed to the sun. The plants are usually increased by dividing the rootstocks or old stools about the end of September, or early in spring, and replanting them 2–3 ft. apart each way. The old rootstocks should be as carefully divided as possible with a sharp strong knife or keen spade, taking care that each separated portion contains at least one or two good buds. It is better not to cut from plants fresh planted, but allow them at least one season to become properly established. They will then last in a good condition for 5 or 10 years without disturbance.

Manuring.—To keep up a good supply, however, and to prevent the plants exhausting themselves and the soil, a heavy dressing of short and well-decomposed manure should be forked into the ground every autumn or winter. This will enable them to grow vigorously and produce good 'sticks' each season.

Forcing.—Rhubarb may be forced either out of doors or in greenhouses, Mushroom houses &c., and is easily produced. For outdoor forcing it is only necessary to cover the crowns of the plants with pots or boxes as recommended for Seakale (see p. 1121), afterwards heaping leaves, litter, or hot manure over them. In this way blanched Rhubarb may be obtained for use very early in spring. Even dry leaves or litter heaped over the crowns of the plants without boxes or pots will give good results. As the leaves, however, are frequently blown about by strong winds early in the year, it is necessary to keep them constantly raked up over the Rhubarb crowns.

Indoor forcing may begin about November. The 'stools' are lifted from the open ground and transferred to a temperature of 55°–60° F., but not more, at least to begin with, otherwise decay is likely to set in at that period. A little fine rich soil may be sprinkled between the clumps, which are placed close together, and growth is greatly assisted by watering with tepid water.

Picking Rhubarb.—Probably few people give this matter any consideration at all, and just pick whatever stalks come first. A little consideration of the functions performed by the leaves, however, as explained at p. 84, will convince any one that Rhubarb should be picked judiciously. As a rule the leaves are fit for picking when fully grown. The stalks are then mature, and contain a full supply of saccharine matter, and it is only such leaves that should be pulled with a sharp outward jerk and twist. A sufficient number of leaves should be left growing to each plant to assimilate food and reserve materials for the crowns which are to remain dormant in winter. By pulling all the stalks from a plant no food can be manufactured; the rootstocks suffer in consequence, and give feeble results next season.

VARIETIES.—There are several forms grown, among the best being *Champagne*, an excellent all-round variety with deep red stalks; *Early Red Goliath* or *Monarch*, having very large and broad leaf-stalks; *Linnæus*, excellent for forcing; *Royal Albert*, and *Myatt's Victoria*.

VEGETABLE MARROW (CUCURBITA PEPO OVIFERA).—A highly esteemed vegetable belonging to the Gourd Family (see p. 460). It has long rambling rough stems, and deeply lobed and cut leaves, and although easily cultivated as a rule requires a little care and attention at first, as it is by no means a hardy plant.

Culture &c.—Being an annual, and also a tender one, the Vegetable Marrow is raised from seeds sown in gentle heat about April. It is scarcely worth while sowing earlier, as the plants cannot with safety be planted out of doors until the end of May or beginning of June. The flattish elliptic seeds may be sown singly in small pots in rich light soil. When the roughish lobed leaves have been formed, the seedlings may be placed in a larger pot, and grown on as quickly as possible. They must, however, be gradually hardened off in light and airy positions so as not to be too tender at planting out time. If soft and not well 'hardened off,' they are almost sure to suffer a severe check when planted out, and from this they may never recover. It is usually safer to protect the plants with handlights at night time for a week or a fortnight until they have become fairly well established in their new quarters. In the absence of handlights old boxes or flower pots will do just as well, but all coverings should be removed as early as possible in the morning, and should not be put on until late in the evening.

Seeds of Marrows may also be sown during May and June in the open ground where they are to fruit. Except, however, in warm southern localities, plants raised from seed in this way generally come into a fruitful condition rather too late in the season, and may be destroyed by early frosts before they have produced a sufficient number of fruits to pay for the trouble of growing them. But a small hotbed of fresh horse-dung and leaves covered with a few inches of soil may be used for sowing the seeds out of doors under handlights, which may be removed altogether as soon as the weather permits.

Soil. — The soil for Marrows can scarcely be too rich. It should be thoroughly drained, yet never lacking in moisture. Any waste part of the garden, so long as it is well exposed to sun and sheltered from the east and north winds, will suit Marrows. Three plants may be placed about a foot apart on a mound of rich soil composed of loam, leaf soil, and well-rotted manure. The main shoots are turned so as to run in three different directions. After running some distance they may have the tops pinched out. This will induce side shoots to spring from the axils of the leaves. When the side shoots have grown 2 or 3 ft. long, they may also have the points pinched out so as to develop side growths on them in the same way. The plants may then be left to ramble about for themselves, and only require to have the leading shoots so arranged that they run in different directions, without becoming entangled.

I have seen excellent Marrows produced by allowing the shoots to ramble over an old hedge, like Bryony (see p. 461), and the leaves on the plants have been quite uninjured by early frosts, while those on the more or less level surface were completely shrivelled and destroyed.

Mulching and Watering.—After planting, and once or twice during the season, it will pay for the trouble to place a good mulching of well-rotted manure or leaf soil round the roots of the plants. When the bed or little mound on which they are placed is made, a hollow may be left in the centre so that it will hold a good supply of water and rain. Drought is one of the great causes of failure in Marrow growing, and when the plants are making rampant growths they can hardly receive too much water or liquid manure. Their large leaves throw off immense quantities of water in the shape of vapour on hot summer days, and to enable them to do this the roots must be kept well supplied.

The Marrow is a monœcious plant, that is, its pistil-bearing flowers and its stamen-bearing flowers are quite distinct from each other although borne on the same plant. The pistillate flowers are the only ones which produce fruits. The latter are usually fit for cooking when the withered flower drops from the end, and before they become full grown with a hard, tough, and leathery rind.

Mildew sometimes attacks the foliage in unfavourable seasons, but may be kept in check by dusting the leaves when damp with flowers of sulphur or liver of sulphur. Aphis and other insects are destroyed and kept at bay by spraying with soapy water in the evening. The leaves should never be wetted during hot sunshine.

Bush Marrows, as the name indicates, are much more bushy in habit than the trailing varieties. They are taller and more sturdy in growth, but require exactly the same treatment. If anything, however, they like much more moisture at the root than even the trailing varieties, and they enjoy frequent waterings with liquid manure during the summer months.

VARIETIES.—The best known Marrows are the *Large White* or *Cream*; the *Large Green*; *Green Striped*; *Hibberd's Prolific*; *Moore's Vegetable Cream*; *Pen-y-byd*, a round Marrow with an excellent flavour; *Custard*; *Muir's Hybrid*; and the *Bush* or *Cluster*.

Gourds.—As these belong to the same genus as the Marrow, and require precisely the same cultural treatment, it is unnecessary to say more about them here, more particularly as they have already been referred at p. 460 as ornamental plants for the flower garden when grown on poles, trellises &c.

CUCUMBER (CUCUMIS SATIVUS).—The Cucumber is a native of the East Indies and a first cousin to the Marrow, but is not so rank in growth, the stems being more slender, and the leaves and flowers smaller. Thousands of plants are grown under glass annually, and the fruits of some excellent varieties such as *Rollison's Telegraph*, *Tender and True*, *Lockie's Perfection* &c. are in great demand.

Culture and Propagation.—Although scarcely within the scope of a work devoted to the cultivation of hardy plants, the Cucumber is such a universal favourite, and may be so easily grown with the help of a hotbed and glass frame, that it may very well find a place in the pages of this book.

Any time from the middle to the end of February a hotbed may be made up in the way described at p. 46 by means of good rich stable manure, leaves &c. A warm and sheltered position in the garden should be chosen for this hotbed, so that the temperature will not be reduced by cold winds. The manure having sunk down or settled, the bed should be again made up to the proper depth of 3-4 ft. All the rank steam and heat must be allowed to escape from the hotbed before it is safe to plant. The sides of the frame should also be well sunk into the bed, so as to retain the heat for as long a period as possible.

Sowing the seed.—The best way to raise Cucumbers is to sow the seeds singly in rich sandy soil in small pots, from the beginning to the middle of February, and plunge in bottom heat, either in a greenhouse or on a hotbed already in working order. When the seedlings have made one or two rough leaves beyond the seedling ones they may be transferred to larger pots and grown on so as to be ready for planting in the hotbed about the middle of March.

Soil and General Treatment.—A rich turfy loam gives excellent results with Cucumbers, and with it may be mixed a little well-decomposed stable manure. Each plant should be placed in the centre of a mound of soil 9-12 in. deep, and well watered in with tepid water. The lights should be kept close for two or three weeks after planting, and only a small crack of air is necessary afterwards when the plants are in full growth. During very hot or bright sunshine the plants may be shaded lightly with a bit of canvas or matting, which however should be removed as early as possible, as Cucumbers like plenty of light. The plants like plenty of water when growing, and the foliage should also be well sprinkled or syringed two or three times a day, as, if the atmosphere is allowed to become at all dry, the leaves are almost sure to be attacked by a pest known as Red Spider—a tiny insect that collects in great numbers usually on the under surface of the leaves, giving them a rusty appearance.

Training and Stopping. — Cucumbers grown in frames must be trained in a somewhat different manner from those grown in greenhouses. In the latter the roughish climbing stems, or 'vines' as gardeners call them, may be allowed to reach the full length of the side of the house before they are stopped. But in frames where space is limited the main stems are usually stopped—that is, the tops are pinched off—when about 2 ft. long. This causes the development of side shoots from the axils of the leaves, and it is on these side shoots that the Cucumber fruits must be looked for. When the side shoots have developed one or two fruits, they may also be stopped at the joint beyond the fruit, not immediately next to it. The fruits will thus secure a greater amount of sap and begin to increase in size more quickly. It may be mentioned that the 'stopping' or pinching out of shoots is always best done with the finger and thumb; the end of the shoot is thus squeezed together, and a clean flat surface is not left as when cut with a knife, and 'bleeding' (see p. 28), or an exhausting overflow of sap, does not take place to such an extent.

When the fruits are attaining a fair size they may be inserted into cylindrical glass tubes 12-15 in. long, placed on the surface of the soil. They will thus be kept nice and straight and look better than when allowed to become more or less crooked. Where glass cylinders are not used, an excellent substitute may be made by nailing 3 pieces of lath or batten together in the form of a trough, a cross section of which is represented by the letter U. By placing the fruits in such receptacles they are kept in a symmetrical shape.

A reference to the natural order Cucurbitaceæ to which the Cucumber belongs will show that it is a 'monœcious' plant, that is, male and female flowers are borne separately but on the same plant. As it is, however, quite unnecessary that the female flowers should be fertilised with pollen from the male flowers to produce fruit, the male flowers, which are readily distinguished by not having an ovary behind as in the female flowers, may be pinched off as they appear. The female flowers are readily recognised even in the youngest state by means of the small warty cylindrical ovary which becomes the future Cucumber without having been fertilised. Indeed, except when it is desired to save seeds, the female flowers should not be fertilised.

When seeds are required one or more female flowers should be selected and marked with a piece of cotton &c. so as to readily distinguish them. Pollen from the male flowers should then be collected on a piece of paper and applied to the stigmas in the female flowers. If stigmas and pollen are in a proper reciprocal condition the fertilisation of the ovules in the young Cucumber will take place, and seeds are produced in due course in the way described at p. 24.

Diseases &c.—Besides the attacks of Red Spider, which are checked by means of a moist atmosphere, Cucumbers often suffer from 'Eel Worm,' tiny thread-like maggots that bore into the roots and lower portion of the stems and destroy their tissues. They are difficult to get rid of, if once fairly established. The best remedies seem to be the use of clean turfy loam and a good dressing of soot and lime over the ground on which the plants are to be grown.

Cold Draughts and variable temperatures are often responsible for several ills, such as producing 'curly' fruits, or those which begin to decay when about half grown. A warm, equable, and moist atmosphere is always best for Cucumbers, and will do more than anything else to keep the plants in good health.

RIDGE CUCUMBER (CUCUMIS SATIVUS).—Besides the varieties of Cucumbers which can be grown with any degree of success only under glass there are others suitable for cultivation in the open air. These are usually called 'Ridge' Cucumbers. Some of the best are *King of the Ridge*, which has smooth fruits 12–16 in. long; *Long Green*; *Wood's Improved*; *Stockwood*; *Long Prickly*, and the *Gherkin* or *Short Prickly*, the latter being much used for pickling.

Outdoor Cultivation. — The seeds of any or all of the above varieties may be sown in March in light rich soil in small pots, and placed in gentle heat. When well above the soil and making rough leaves the young plants may be potted and grown on as recommended for Marrows, so that they may be sturdy and well hardened for planting out in June.

A warm sheltered spot facing south should be selected for outdoor Cucumbers. A trench about 2 ft. deep, or large holes, may be made and filled with hot dung and leaves which have been well turned over several times before the plants are ready for placing out of doors. On this hotbed a mound of rich sandy loam and a little leaf soil may be placed. The mounds or ridges should be 4–5 ft. apart, each one having a plant in the centre. Each plant should be well watered in, and until fairly established it is better to cover it with a handlight, and to keep it shaded from bright sunshine. Afterwards the lights may be removed altogether.

The leading shoots are trained in such a way as to radiate from the main stem. When about 18 in. or 2 ft. long the tips may be pinched out to form side shoots to develop early fruits. The side shoots also may be stopped at the joint beyond the fruit that has set, and so the process may be repeated from time to time during the growing period. The chief thing to remember is not to allow the shoots to become entangled and overcrowded, and to keep the plants well supplied with water at the roots. The fruits should not be allowed to get too old before cutting. They are best while still green and fresh looking, and are all the better if they are not fertilised for seed. When the latter is required, a promising pistillate (female) flower should be selected, and have the pollen conveyed to it from one of the staminate flowers, so that fertilisation of the ovules (or rudimentary seeds) may be assured.

MELON (CUCUMIS MELO). — The Melon, like the Cucumber, is a monœcious plant and a native of the East Indies. It is not, however, so extensively grown as the Cucumber, probably because many people are under the impression that special structures and treatment are necessary to bring its rich and succulent fruits to perfection.

It may, however, be stated that for all practical purposes Melons are as easily and almost as successfully grown in frames as Cucumbers, but the choicest fruits of course will always be obtained from hothouses.

Soil &c.—This should be a rich turfy loam placed in the hotbeds exactly in the same way as recommended for Cucumbers. Although stable manure is often added to the soil it is better to dispense with it, as it encourages a free sappy growth. To the turfy loam, however, may be added some old mortar rubble or plaster—about 2 barrowloads to a cartload — and half the quantity of leafsoil, thoroughly mixing the whole before placing in the frames. The seeds should be sown in the same way as recommended for Cucumbers, and at the same time. All rank steam should be allowed to escape from the frames before planting, and every attention should be given to training, pinching out the tips of the shoots, watering, syringing &c., as already detailed for Cucumbers. A regular temperature, plenty of light, and a moist atmosphere are essential points in the culture of Melons when they are growing vigorously.

Setting the Fruits.—Unlike Cucumbers, it is essential that the female flowers of the Melon should be fertilised with the pollen of the male flowers to induce the development of the fruits. The 'setting' or fertilising process is performed as follows:—When a sufficient number of female flowers (that is, those containing pistils only) are fully open, an expanded male flower (that is, one with stamens only) has the corolla detached; the pollen is then applied to the pistils in the female flowers by holding the male flower and using it like a little brush or duster. If the pollen and the surface of the pistils are both in proper condition fertilisation will be effected in the way described at p. 24, and the fruits will in due course begin to swell. To ensure success, the pollen should be applied to the stigmas on bright sunny days between 12 and 2 o'clock, and syringing the plants should have ceased a day or two beforehand, so as to secure a dry atmosphere.

After the fruits have 'set,' the plants may be again syringed regularly, two or three times a day, until they begin to show signs of ripening — indicated by the change of colour and the perfume. Watering the roots and syringing the foliage must then gradually cease, and more air should be given in fine weather so as to hasten the ripening of the fruits, and prevent them cracking.

It is a good plan to fertilise more flowers than the number of fruits actually needed, so that after 'setting' the most likely ones can be retained to develop. About 6 fruits to a plant is quite sufficient, and the number should be decreased rather than increased to secure the finest examples. The fruit-bearing shoots should have the tops pinched out to one joint beyond the fruit in the same way as for Cucumbers, so that the extra nourishment will be absorbed by the fruit.

As the fruits begin to swell care should be taken to prevent their contact with the soil by means of a piece of board 3–4 in. square being placed beneath each one, with a hole in the centre to allow moisture to pass away. If the stems are trained over a wire trellis, as is often done when the plants are grown in deep frames or 'pits,' the fruits should be supported by matting or netting as they increase in weight.

VARIETIES OF MELONS. — Of these there are a large number, those generally grown being divided into scarlet-, green-, and white-fleshed varieties according to the colour of the flesh. The kind, however, most suitable for growing in frames is a white-fleshed one called *Hero of Lockinge*, which bears freely, has a deep golden colour when ripe, and an excellent flavour. *Sutton's A 1* is another good Melon.

CROSNES (STACHYS TUBERIFERA).— This is a Chinese and Japanese plant which was introduced to cultivation about 1885, and was recommended as a vegetable on account of its white conical and necklace-like tubers. It grows 1–2 ft. high and has ovate acute deeply veined leaves which are more or less hairy and rough in texture. The flowers are said to be rosy and borne in a leafy spike, like many other plants in the Labiate Order (p. 742) to which it belongs. The tubers are borne on creeping underground stems very much in the same way as Potatoes, but they are quite unlike the latter in appearance. An entire tuber is about the length of the little finger and is composed of 4–6 or more roundish or oblong divisions united to each other, those in the middle being usually larger than those at the ends. Each portion bears a bud or 'eye' and may be used for increasing the plant.

Culture and Propagation. — This plant grows freely in ordinary good garden soil and in course of time may be more extensively cultivated in the British Islands than it is at present. It is grown more largely in France, where the tubers are known under the name of 'Crosnes' du Japon. Each plant bears a very large crop of the white constricted tubers, which in a raw state somewhat resemble those of the Jerusalem Artichoke in taste. When the leaves wither in autumn the tubers may be lifted, and eaten either in a raw state or cooked and used with sauces. The tubers for planting out in spring may be stored in sand until the proper time, when each portion with an eye or bud will produce a plant in the course of the season.

THE HERB GARDEN

Attached to every well-regulated Vegetable Garden is a piece of ground—large or small—set apart for the cultivation, on a much smaller scale than the usual vegetable crops, of other plants which are used for seasoning and flavouring. These plants are popularly called 'herbs' or 'sweet herbs' owing to the sweet and aromatic scent of many of them, and the agreeable flavour they impart to various cooked dishes. According to the size of the garden and the tastes of the owner, so herbs are more or less properly grown. In some gardens there is a great variety of herbs, but in others only one or two of the best known and most generally used are to be found. The kinds described below have been arranged in alphabetical order, as it is scarcely worth while grouping them according to their natural relationship. A reference, however, to the latter is given so that the reader may be able to classify any particular herb.

AMERICAN CRESS (BARBAREA PRÆCOX). — Notwithstanding the transatlantic name, this is a native biennial with rosettes of leaves somewhat resembling those of the Watercress (see p. 1166), to which it is closely related, and belongs to the Cruciferous Order, p. 201.

Culture. — The American Cress will grow in any light garden soil, and is easily raised from seed sown during August and up to the middle of September, according to the season, to keep up a supply of leaves for use in winter and spring. The seeds may be sown also in spring in shallow drills about 9 in. apart, and the seedlings may afterwards be thinned out 3–6 in. apart in the rows.

BASIL (OCYMUM BASILICUM).—This is a tender annual native of India. Its leaves are valued for flavouring. It grows about 1 ft. high, and has a much-branched habit. The leaves are ovate lance-shaped and obscurely toothed, and the small white flowers are produced in leafy clusters from July to September. It belongs to the Natural Order *Labiatæ* described at p. 742.

Culture and Propagation.—Seeds may be sown in light rich soil under glass about March and April. The seedlings are pricked out into boxes, and after becoming established should receive as much light and air as possible to harden them off by June when they may be planted out about 8 in. apart. The plants flourish in ordinary good garden soil. Before the flowers expand the stems may be cut down almost to the ground, tied in bunches, and hung up in a cool, dry, airy place so as to gradually die off and be fit for winter use.

The 'Bush' Basil (*Ocymum minimum*) is dwarfer in growth than the ordinary Sweet Basil, but may be grown in the same way.

CHERVIL (ANTHRISCUS CEREFOLIUM) A hardy European annual 1–2 ft. high, with much-divided leaves as in many plants belonging to the order Umbelliferæ (see p. 464), and small white flowers produced in umbels. The young leaves are used for salads, flavouring soups &c., and are obtainable for use about 2 months after the seed is sown.

Culture.—To keep up a good supply of young and tender leaves, seeds may be sown out of doors about every eight weeks from March to the end of September. Any good garden soil will suit Chervil. The seeds may be sown in shallow drills, 8–9 in. apart, or broadcast in small beds, in open sunny situations for the spring and autumn crops, but in rather shaded spots for the summer supplies. During the warm weather good soakings of water may be given frequently in the evening. There are two kinds of the Common Chervil grown, namely the *Plain-leaved* which has a fine aromatic flavour; and the *Curled*, which is equally aromatic, but owing to the beautifully crisped character, is more highly valued for garnishing, flavouring &c. It should be grown in preference to the *Plain-leaved* variety if only one kind is required.

BULBOUS or TURNIP-ROOTED CHERVIL (CHÆROPHYLLUM BULBOSUM). Like the ordinary Chervil this also belongs to the Umbellifer family (see p. 464). It is a biennial plant native of S. Europe, about 3 ft. high with stout stems swollen at the joints and flushed with violet, the lower portion being clothed with whitish hairs. The roots resemble those of a short Carrot or small Parsnip, and when cooked like Carrots they have a sweet and pleasant flavour.

Culture.—The bulbous-rooted Chervil may be grown in ordinary good and well-drained garden soil, well dug and manured some time previous to sowing the seeds. As the latter do not retain their vitality very long they should be sown as soon as ripe about August and September in shallow drills 9–12 in. apart. This, however, can only be done with safety in the mild southern parts of the kingdom. In cold localities autumn-sown seed is likely to perish during the winter. In such places it is therefore better to store the seeds in sand during the winter. By placing a layer of sand and a layer of seeds alternately, sowing may be deferred until mild weather sets in about March or April. The seeds will be kept fresh by this process of stratifying them, and may then be sown as stated above.

The roots will be ready for use when the foliage turns yellow and begins to wither. They may then be lifted and stored in the same way as Carrots.

CHIVES (ALLIUM SCHŒNOPRASUM). This is a hardy native perennial, closely related to the Onion (see p. 1148). It has small oval bulbs smaller than a Filbert. They grow in masses and send up tufts of slender deep-green grass-like leaves, but cylindrical and hollow. The flowers are purple-red and borne in round heads just above the foliage.

Culture. — Chives flourish in any good and warm garden soil in an open situation and may be allowed to remain for several years in the same spot without disturbance. It is better, however, to take them up about every fourth year and divide them. They are usually increased by dividing the masses of underground bulbs in spring, and replanting about 6 in. apart, either in rows about 1 ft. apart in beds, or to form an edging. The leaves grow rapidly and should be cut for use close to the ground while still young and tender. They are chopped into small pieces and used for soups &c. in the same way as small Onions. The more often the leaves are cut the better the new ones grow. In winter the soil may be given a dressing or mulching of manure which may be forked in some time in spring.

CORN SALAD or LAMB'S LETTUCE (VALERIANELLA OLITORIA).—This is a native hardy annual belonging to the Valerian order described at p. 488. It has radical unstalked and more or less spoon-shaped leaves, rather strongly veined and forming dense tufts on the surface of the soil. The flower stems are 6–12 in. high, angular, and several times forked, with small pale lilac blooms.

Culture. — Seeds may be sown in ordinary good garden soil, the richer the better, in rows about 9 in. apart, or broadcast in beds. The seedlings are thinned out to about 6 in. apart, and those taken up may be transplanted at similar distances. To keep up a succession seeds may be sown in March and April, and again in August and September. In severe winters it is better to scatter a little dry litter, bracken &c. over the plants, removing it on all favourable occasions. During the summer months weeds must be kept down, and if the plants are fully exposed to the hot sun, frequent evening waterings will be beneficial.

The leaves are valued by many for salads. In early summer the entire plant is used, being then in a fresh and growing state.

Varieties.—Besides the Common Corn Salad the others are the *Round-leaved*, which has shorter leaves than the ordinary; the *Cabbaging*, a somewhat less vigorous kind than the Round, but firmer and more pleasant as a salad; and the *Italian*, which is recognised by the lighter colour of its leaves and their greater length. It is really a distinct species and is known as *Valerianella eriocarpa*, but its cultural requirements are the same as the ordinary Corn Salad.

CRESS (LEPIDIUM SATIVUM).—The garden Cress is a quick-growing Persian annual, much cultivated for its young leaves, the pungent flavour of which is highly valued as a salad. It belongs to the Crucifer Order, and forms straggling rosettes of much-divided leaves, and produces small white flowers when allowed to fully develop.

Culture. — This is very simple. Seeds may be sown out of doors in any ordinary soil raked over and made fine and level. From March to September seeds may be sown thickly about once a fortnight to keep up a good supply, and very slightly or not at all covered. During the season the early and late sowings should be in warm sheltered spots, but the summer sowings are best in a moist and shaded position. The seeds may be sown in drills or broadcast, and to hasten germination a mat may be placed over the beds, but must be removed immediately the seedlings appear. This is often in less than 24 hours if the temperature is between 50° and 60° Fahr.

During the winter months the seeds may be sown in shallow boxes of fine rich sandy soil and placed in a hotbed. It is an excellent plan to strain a piece of porous canvas or sacking over the soil in a shallow box, and then sow the seed upon this. By this means the roots strike downwards into the moist soil, and when a crop of salad is produced it may be cut off easily and without risk of getting it mixed up with the gritty soil.

Varieties. — The Common Garden Cress is the one most extensively grown, especially in greenhouses. The leaves are cut when the seed-leaves are formed, and are neatly stacked upright in small punnets for sale, just as if the plants had been grown in them. The *Curled Cress* is a hardier variety, and the leaves are used for salads and garnishing. They may be cut two or three times in succession, whereas the Plain-leaved Cress can be cut only once. The *Golden* or *Australian Cress* is a yellowish-leaved form always readily recognised.

Mustard and Rape (see p. 1164) are grown in the same way as the Plain-leaved Cress. If, however, the Mustard or Rape is to be used at the same time as the Cress, the seeds of the latter should be sown about two or three days before those of the former.

HOREHOUND (Marrubium vulgare). — A hardy European perennial sometimes found wild in Britain in waste places. It has stout branched stems 12–18 in. high, and broadly ovate crenate much-wrinkled and leathery leaves about 1 in. or more in length. It belongs to the order Labiatæ (see p. 742) and is sometimes cultivated for its leaves, which are used for flavouring, and also as a remedy for coughs.

Culture. — Horehound will grow in any garden soil. Seeds may be sown in March and April out of doors where the plants are to grow, and they require no attention beyond thinning out a little at first if too thick. Established plants may also be divided in spring to increase the stock if necessary.

HORSE-RADISH (Cochlearia Armoracia). — A British and European perennial plant with long, stout, cylindrical rootstocks, and oblong deeply crenate or serrate shining green leaves 8–16 in. long, on stalks about a foot in length. It belongs to the Crucifer Order described at p. 201.

Culture and Propagation. — Horse-radish is grown for its roots, which are scraped into slender shreds and used as a condiment like mustard with roast beef &c. It is often found growing in any half-wild or out-of-the-way part of the garden in a more or less neglected state, and its rootstocks are hence often stringy and bitter in flavour. To obtain good results, Horse-radish should be grown in deep, rich, and well-drained soil in open sunny situations. Manure may be applied some time previous to planting, but it is better to keep the roots away from contact with it in a fresh state.

Horse-radish is usually increased by cuttings of the roots. The thinner portions are cut into pieces about a foot long, and planted in a sloping or almost horizontal position in the soil (which has already been well prepared) in such a way that the crown is about one or not more than two inches beneath the surface. If planted perpendicularly the roots often branch a good deal, and are of very little use in that condition. The pieces may be planted in rows 1½–2 ft. apart, each piece being 9–12 in. apart from the next. This work is usually done in January and February or March, when the ground is in good condition. The following autumn the roots may be fit for use, but it is better to leave them until the following year.

Another method of growing Horse-radish is to take medium-sized roots 1–2 ft. long, and having rubbed off all the rootlets, plant them in a slanting hole made with a strong stick or crowbar, leaving about a foot between them in the rows.

Still another successful method of increasing the stock. As each root often has 2–8 buds or crowns, each one of these may be cut off with a sharp knife. About 2 in. of the root should be attached, and the 'crowns' may then be planted at the bottom of a hole about a foot deep made with a crowbar. During growth the crowns will be pushed up to the surface of the soil to develop foliage, and the following year good straight stems of Horse-radish will have been produced. A modification of this system is to plant the crown-buds about 2 in. beneath the surface at the seasons mentioned. They may then be covered with a foot or more of rich soil, and during the season tender stems will be pushed up through the mounds of soil thus made.

Where large quantities of Horse-radish are required, fresh cuttings should be put in every spring. The plants will thus always be fairly young, and will yield more satisfactory and more highly flavoured roots than those obtained from old roots which have been left undisturbed for years.

HYSSOP (Hyssopus officinalis).—A South European evergreen undershrub with oblong lance-shaped leaves and usually blue or sometimes white or pink flowers in whorled spikes, as in many other plants belonging to the same order (Labiatæ, see p. 742).

Culture. — Hyssop is grown for its leaves and shoots which are used as pot herbs or as a condiment, on account of their aromatic and rather hot and bitter taste. Hyssop flourishes in a rich and rather chalky soil, and is hardy in ordinary winters in the British Islands, but is likely to be killed in severe winters. It may be increased by dividing the tufts in early spring just as growth is about to commence. Seeds may also be sown in the open air in April and May in warm spots, and the seedlings may be transferred to their permanent quarters in showery weather in June.

INDIAN CRESS or **NASTURTIUM.**—The young leaves and shoots of *Tropæolum majus* and *T. minus* are sometimes eaten as salads, or between bread and butter as sandwiches. The young and quite green fruits are also pickled and used as a substitute for Capers, those of *T. minus* being preferred.

Particulars as to the culture, propagation, and description of these two species and others will be found at p. 290 under the genus *Tropæolum.*

MARIGOLD (Calendula officinalis).—This S. European annual has already been referred to as a plant for the flower garden at p. 544. The cultural directions given there may be carried out when the Marigold is cultivated as a pot herb. For this purpose the flowers are used. When fully expanded between June and September they are gathered and hung up to dry slowly, and are afterwards used for flavouring soups, colouring butter &c.

MARJORAM. — There are a few species of Marjoram cultivated as Sweet Herbs, all belonging to the genus *Origanum*, which has been described at p. 744. The *Sweet* or *Knotted Marjoram* (O. Majorana) is a tender biennial, native of Egypt, and grows 1–2 ft. high, having downy oblong ovate leaves and purplish or white flowers borne in spikes in early summer.

Culture and Propagation. — It will flourish in ordinary garden soil. Seeds may be sown out of doors in a warm sunny position in April and May, in shallow drills. The seedlings if too thick are thinned out to about 6 in. or more apart. The flower spikes and tops of the plants are cut and dried slowly in the shade for use in flavouring and seasoning the following winter and spring.

POT MARJORAM (O. Onites). — This is a perennial undershrub, about a foot high, native of the Mediterranean region. It has somewhat ovate serrate leaves, without stalks, and more or less downy or hairy. The whitish flowers are produced in summer and autumn, and with tops of the plants may be slowly dried and used in the same way as the *Sweet Marjoram.*

Culture and Propagation. — The Pot Marjoram rarely ripens seed in the British Islands. It is therefore usually increased by dividing the tufts in early spring, as growth is beginning, or by inserting cuttings of the shoots in rich sandy soil under a bell-glass during the summer months. The rooted cuttings may be transplanted about a foot apart the following spring, into ordinary good garden soil.

MINT or **SPEARMINT** (Mentha viridis).—A well-known perennial herb, of the Labiate order (see p. 742), with a creeping rootstock, and nearly stalkless lance-shaped, acute, shining green leaves strongly veined. It is cultivated and highly valued for the tender tops of the shoots, which are used for sauces &c. They may also be dried and stored away in bags for use.

Culture and Propagation. — Mint flourishes in the open air in light garden soil inclining to be rather moist than dry. In cool and partially shaded positions it will last for many years spreading by means of its squarish underground creeping stems. The leafy stems should be cut down to the ground every autumn, and a layer of fresh soil and manure placed over them.

Mint is readily increased by dividing the rootstocks in spring during mild weather when growth has commenced. The divided portions may be planted in rows about 6 to 9 inches from each other, or in beds, and covered with a couple of inches of good soil. It is necessary that each divided portion should have as many roots as possible, as otherwise they are unable to become established quickly from the risk of being killed by spring frosts.

Cuttings of the tops 3–6 in. long will also root freely during the late summer if inserted about half their length in cool shaded borders or beds 6 to 9 inches apart. If the weather is dry attention must be given to watering, and a good soaking at evening time or very early in the morning will benefit the cuttings and cause them to root more quickly.

Forcing Mint. — Where hotbeds or greenhouses exist and can maintain a temperature of about 60° Fahr., Mint may be readily forced from November to May. The roots are lifted, placed in boxes, and covered with fine soil. They are then placed in the heat required and kept watered. The young and tender leafy shoots when from 3 to 6 inches high may be cut for immediate use.

MUSTARD (Sinapis alba). — This native annual is often grown to be used with Cress, and is quickly raised from seeds in the same way, either indoors or in the open air (see p. 1161), but should be sown 2–3 days later than Cress to come into use simultaneously. It may be mentioned that *Rape* (Brassica Napus) is frequently grown instead of Mustard, but exactly in the same way. It is rather milder in flavour and is more appreciated by some.

PENNYROYAL (Mentha Pulegium). A hardy British and European perennial with trailing stems which root freely at the joints. The leaves are roundish oval, slightly hairy, and greyish-green in colour, and the pale purple flowers appear in late summer and autumn. The plant belongs to the Labiate Order (p. 742).

Culture &c.—Pennyroyal is cultivated for its leaves, which are used for flavouring and have a strong and agreeable scent. The plant likes a rather heavier and moister soil than Mint. It is easily increased by dividing the plants in spring, or by inserting rooted pieces of the stems in the soil.

PEPPERMINT (Mentha piperita). This is also a British and European perennial with trailing branched and reddish stems which root freely at the joints like those of *Pennyroyal*, to which it is closely related, and belongs to the same order (Labiatæ, p. 742). The leaves are more or less ovate-oblong, and the purple flowers are borne in loose blunt spikes in late summer and autumn, but do not ripen any seeds.

Culture &c. — Peppermint may be grown in the same soil and situation as *Pennyroyal*, and may be increased in the same way by division and cuttings of the rooted stems.

SAGE (Salvia officinalis). — This well-known herb is a hardy evergreen tufted undershrub, 1 ft. or more high, native of S. Europe. It has woolly white stems, and oval toothed or wrinkled leaves greyish or whitish-green in colour. These are used for seasoning when dried. The purple, blue, or white flowers appear in summer and have the usual characters of the Labiatæ order (see p. 742). Other Sages useful for the Flower Garden are described at p. 746.

Culture and Propagation. — Being found wild on dry chalky hills, the Sage plant will thrive best in a similar soil under cultivation, but flourishes in any good and well-drained garden soil, and seems to be almost perfectly hardy. It is easily increased by sticking the leafy stems—with a portion of the old wood at the base if possible—in the soil any time in March and April. So long as these slips are kept fairly moist until rooted, they require no further attention, and in the course of a year or two each one will make a dense little bush from which other slips may be taken if necessary. Cuttings may also be inserted in the same way and require the same attention. Seeds may also be sown in gentle heat in March and April. The seedlings are pricked out and hardened off so as to be ready for the open ground in June. As a rule, however, plants from seeds are of a somewhat inferior strain, and often have smaller and narrower leaves.

SAVORY.—There are two kinds of Savory grown, namely the *Summer Savory* (Satureia hortensis) and the *Winter Savory* (S. montana). They both belong to the order Labiatæ (see p. 742) and their leaves and young shoots are used for seasoning in the same way as Sage and other herbs.

Summer Savory (*S. hortensis*).—This is a South European annual, 6 to 9 inches high, with branching stems, and downy oblong linear leaves narrowed into a short leaf-stalk. The pale lilac or whitish flowers are borne in small clusters in summer. The whole plant is very fragrant, and the leaves and young shoots are used for flavouring boiled Beans and other dishes.

Culture &c. — Seeds may be sown out of doors in light and good garden soil in April and May. When large enough to handle easily, the seedlings should be thinned 6 to 9 inches apart in the rows, which should have about a foot of space between. The plants must be watered in dry weather, and when the flower buds appear, the stems may be cut off and hung up to dry for future use. The cut down plants will continue to produce fresh shoots, and these also may be gathered later on.

Winter Savory (*S. montana*). — This is also a native of S. Europe, but is a dwarf perennial 12 to 18 in. high, with spreading branches and oblong linear leaves, sharply pointed, and slightly channelled above. The pale purple, pinkish or white flowers appear in summer in spikes or racemes.

Culture. — Winter Savory may be grown in similar soil and situations to its relative, the Sage. It may also be increased by means of seeds, cuttings, or slips in the same way as recommended for that herb (see p. 1164). In favourable places it is practically hardy, and by cutting down the old stems every spring a good crop of young shoots is produced. These are used for flavouring.

TARRAGON (ARTEMISIA DRACUNCULUS).—A South European perennial about 2 ft. high, with branching stems, and entire lance-shaped leaves, which emit a delicate aromatic scent, and are much valued for seasoning. The small whitish flowers appear in summer, but they never or very rarely ripen seeds in cultivation.

The plant belongs to the Composite Order, and other species of Flower Garden value are described at p. 538 under the genus Artemisia.

Culture. — Tarragon flourishes in any dry and good garden soil, and once established may be left to look after itself. It is easily increased by dividing the plants in spring, when growth has commenced. Cuttings of the young shoots may also be rooted in cold frames in early summer, and transplanted in dull showery weather.

THYME (THYMUS VULGARIS). — A hardy perennial undershrub about 6 in. high, with slender wiry stems and more or less oblong ovate small leaves, deep green above, greyish beneath. The small pale rosy-purple flowers appear in summer in roundish or conical clusters, which lengthen with age. Several species of Thyme are valued as rock plants, and are described at p. 745 under the genus *Thymus*.

Culture and Propagation. — The Garden Thyme is useful for the leaves and young shoots, which are used for seasoning. It will thrive in a good light and rather dry garden soil, and loves a sunny position. It may be increased by dividing the plants in spring in mild weather. Seeds may also be sown out of doors in a warm sunny position in April and May, either in rows, to form an edging, or in a bed. The seedlings may be transplanted in September or the following April in mild showery weather. Cuttings of the young growths will root under a handlight during the summer months. The branches also, if bent down and covered here and there with a little soil, will root from the joints. The plants thus formed may be severed in spring and transplanted about 6 in. apart.

Besides the Common Thyme, the *Lemon Thyme* (*T. Serpyllum*, see p. 745) may also be used for flavouring purposes.

WATER-CRESS (NASTURTIUM OFFICINALE). — This well-known British plant is found wild near the banks of rivers and streams, and is very common on the banks of the Thames. It belongs to the Crucifer order (see p. 201), and has long rooting hollow stems, and pinnate leaves with rather heart-shaped sinuate-toothed leaflets. The small white cross-shaped flowers are borne in short racemes from May to October.

It is held in high estimation by all classes as a salad, and in some parts of the country, as in Hertfordshire, for example, it is cultivated on a very large scale for the London and provincial markets.

Culture and Propagation.— Water-Cress is best grown in shallow streams or pools of clean and gently running water. It is easily increased by planting portions of the rooted stems in the muddy banks on the edge of the water, and leaving them to take care of themselves. Constant picking will improve the plants, and by preventing the formation of the flowers, the leaves and young stems will not lose their flavour.

Water-Cress may also be grown on land, which, however, must always be kept in a moist condition. Seeds may be sown in March and April in the open ground, or better still, rooted pieces of stem may be stuck into the soil, and well watered during the season, so that they do not lose their freshness.

OTHER HERBS. — Many other plants are sometimes used as herbs, but are frequently to be found rather as ornamental plants in the flower garden. Many of these have been already described in the body of this work, and include the following, particulars of which will be found at the pages mentioned:—

BALM (*Melissa officinalis*), p. 746.
BORAGE (*Borago officinalis*), p. 674.
CHAMOMILE (*Anthemis*), p. 530.
CLARY (*Salvia Sclarea*), p. 749.
FENNEL (*Fœniculum vulgare*), p. 468.
RAMPION (*Campanula Rapunculus*), p. 567.
ROSEMARY (*Rosmarinus officinalis*), p. 750.
RUE (*Ruta graveolens*), p. 295.

MUSHROOM (AGARICUS CAMPESTRIS).— Although the Mushroom occupies the last place in this work, it is by no means the least important of our garden crops. Indeed it may be regarded as one of the most important, considering the great favour in which it is held by everyone, and he is certainly a *rara avis* who can sincerely say that he does not like Mushrooms. On the Continent, however, and especially in Italy, the Mushroom is not regarded with the same favour as in the British Islands.

The other plants described in the preceding pages—whether flowers, fruits, or vegetables—are more or less intimately related, and possess a general resemblance as far as roots, stems, leaves, flowers &c. are concerned—the only important exception being the Ferns (see p. 1008).

The Mushroom, however, has neither roots, stems, leaves, nor flowers in the ordinary sense of such terms. It represents a very low order of plant life, and it has thousands of relatives—all grouped under the heading of 'Fungi.' Nearly all Fungi are whitish, pale brown, orange, and sometimes red, with various intermediate shades, and a vast number of them are extremely poisonous. As a rule the highly coloured or those with a verdigris tint should be avoided, unless the reader is well acquainted with Fungi.

The Common Mushroom is found growing wild in pastures and meadows, usually in great abundance about September, especially where horses, cows, and sheep have been grazing. When picked in a young and fresh state they are very palatable—even raw—but when the 'gills' on the under surface of the cap begin to turn black they are best left alone. The true Mushroom when in a fit state for eating has pinkish or salmon-coloured gills, and it is rather important to remember this point, as other species very similar in appearance are poisonous, but have not pinkish gills.

Structure. — The Mushroom springs up from a whitish or cottony network of delicate threads, which constitute what botanists call the 'mycelium,' and gardeners 'spawn.' This network of 'mycelium' may be roughly likened to the roots of ordinary plants, but its functions are absolutely and completely different. The stalk or 'stipes' is surmounted by a circular umbrella-like mass of whitish tissue called the cap or 'pileus,' on the under surface of which are thin delicate plates called 'lamellæ' or 'gills' radiating from the stalk to the circumference. In a young state, when the Mushrooms are called 'buttons,' the edge of the cap all round is united to the stalk by a thin membrane or veil, and traces of this membrane may often be seen forming a ring or 'annulus' round the stalk near the top. On the surface of the thin plates or gills there are special cells protruding, some of which bear stalked spores. It is from these spores under favourable circumstances that the 'mycelium' or spawn is developed, but the mode in which they germinate has not yet been clearly defined. Nor has there been any trace of sexual reproduction between two kinds of organs from the spores, as explained under Ferns at p. 1008.

Culture. — From the preceding remarks it will be at once obvious that Mushrooms being quite unlike any other plants described in this book, as regards either structure, growth, or reproduction, a somewhat different method of cultivation is required. Ordinary flowering plants and Ferns as a rule derive their nourishment by sending their roots into the soil, from which they have been able to absorb a good deal of mineral matter. The Mushroom, however, is incapable of converting mineral or otherwise inorganic matters into food. It can exist only on dead or decaying vegetable or organic matter like most other Fungi, although some, such as the Potato-disease fungus, referred to at p. 1136, will flourish only on living vegetable tissues. Fungi which live on dead or decaying organic matter—whether animal or vegetable—are called 'Saprophytes,' and in this respect they resemble a few degenerate forms of flowering plants.

The decaying matter most suitable for the cultivation of Mushrooms is good stable manure, especially that from horses, of which it may be said, the better the breed the better for Mushrooms. To this may be added leaves of any kind, but preferably those of the Oak and Sweet Chestnut, as they give a more regular and constant heat. The manure must be turned over several times at intervals of a day or two so as to allow the rank heat and moisture to escape. If very hot and dry, water must be thrown over the heap to reduce the temperature and cause quicker decomposition. All long, clean, and undecayed litter is best placed on one side with the fork. It will be useful afterwards for covering the beds.

Making Mushroom Beds. — The manure having been well turned over, and consisting of short well-rotted and equally mixed material, the formation of beds for growing Mushrooms may be commenced. No matter whether indoors or outdoors, whether in barns, boxes, flower pots, shelves, or any other position, the principle of making a Mushroom bed is the same. It may, however, be as well to describe how an outdoor Mushroom bed is made.

A situation sheltered from the north and east should, if possible, be chosen. The ground on which the bed is to be made should be rather higher than that surrounding, so that water will not lodge at the base or around the bed, and thus deprive it of a certain amount of heat. The prepared manure is placed evenly in layers from one end of the bed to the other, and is from time to time well trodden down to make it equally firm all over. The width of the bed at the base may be about 3 ft. (a little more or less does not signify), and the height may be the same. The bed, however, becomes gradually narrower towards the top where it is rounded off. The manure, which should not be dry, nor yet palpably wet, but in an intermediate stage, should then be allowed to cool until the heat in the interior does not exceed 75°-80° Fahr. Some growers say 90°, but the lower figures are generally safer.

Experts at making Mushroom beds know perfectly well whether the temperature is too high or not for 'spawning' simply by pushing a long wooden stake into the heart of the bed, and feeling the buried end with the hand after it has been inserted a day or so in the bed. If unable to rely upon this method of testing the temperature, a long-legged hotbed thermometer may be inserted instead to obtain a more accurate idea as to the heat. In any case, the point to remember is that it is not safe to insert spawn in the beds until the heat has receded to 80° Fahr., and shows an inclination to decline some degrees lower.

'Spawning' Mushroom Beds. — The Mushroom spawn or 'mycelium' referred to above could not be inserted conveniently by itself. It is therefore obtained in a state of suspended animation in 'cakes' or 'bricks,' 16 of which are usually sold to make a 'bushel.' These cakes or bricks usually measure 6 in. by 4 in. and are about 1 in. thick. Each one may be broken into eight more or less equal pieces, and these are inserted at regular intervals—about 6 to 8 in.—all over the bed. Each piece is pressed in firmly so that it is flush with the outline of the bed and will not fall out of the hole into which it is pressed.

'Landing' or 'Soiling' Mushroom Beds.—Having ascertained that there is no inclination for the temperature to rise above 75° or 80° the beds may be covered with 1–2 in. of soil. Where the beds have sloping sides some little skill is required to cover them properly. Good garden soil will do, but rich loam is best. It should be fine and powdery and yet moist enough to adhere well. It is placed on the beds, beginning at the base and working upwards, and is beaten with the back of the spade until it is smooth and level. So that the upper layers of soil may not fall off or scale down, the edge of the last placed layer should always be kept ragged and not patted close to the bed with the spade. The ragged edges serve as a base for the following layers of soil until the top is reached.

Covering the Mushroom Beds.—After the bed has been covered all over with soil and the surface made smooth by rubbing over with the back of the spade—the latter may be frequently dipped in water to facilitate the process of smoothing—the bed is then covered with a layer 1–3 ft. thick of the long straw or litter which had been forked out of the manure when the latter was being prepared for the bed. This is to keep the heat in the bed, and during severe frosty weather the covering should be thick and closely packed.

Some growers before covering the beds with litter place thin canvas over them next the soil. This has the great advantage of preventing the radiation of heat, but it also keeps the Mushrooms much cleaner than when they come in direct contact with the litter. Also, when the beds are being uncovered, the Mushrooms are not torn off and lost among the litter, as is likely to happen when removing the latter.

Mushrooms in sheds, cellars, boxes &c.—Although the preceding remarks apply to Mushrooms as cultivated out of doors in market gardens, any cottager may grow Mushrooms if he has only a square yard of space to spare for the purpose. The corner of a cellar, an old washing-tub, or even a large flower-pot or old egg box may be utilised for the purpose. The fresh horse-droppings and sweepings from the road may be collected and mixed with leaves, straw &c. until the whole has been thoroughly leavened and brought to the proper state for inserting the cakes of spawn. Wherever Mushrooms are grown even on a small scale, it is essential that the temperature of the surrounding atmosphere should not sink below 55° Fahr. If it can be maintained between 60° and 65° it will be much more agreeable, and experience proves that this is about the best temperature for securing a heavy crop of Mushrooms — always provided of course that the 'spawn' used is good.

In many large gardens special structures called Mushroom-houses are fitted up more or less elaborately, and heated with hot-water pipes. The beds are made flat in tiers or shelves one above the other, or arranged in any other convenient way, but should be at least 1 ft. in depth. The process of making them is the same as described above for outdoor beds except that it is not necessary to cover the soil with litter or canvas. The surface of the soil must be kept damp, but not sodden however, by watering occasionally with a fine-rosed water-pot, using tepid water. The atmosphere also should be fairly charged with moisture and kept at a temperature of 60° to 65°, while as a rule light is rigidly excluded. Where light cannot be excluded an old mat or a piece of canvas may be placed over the beds. Darkness, however, is not really essential, and a perpetual night for Mushrooms seems to be opposed to natural laws, especially where the temperature can be maintained at the proper point and where cold draughts can be avoided.

Gathering Mushrooms. — In the case of outdoor beds, about 6 to 10 weeks after 'spawning' Mushrooms may be gathered.

In 'stripping' Mushroom beds the litter is lightly forked down on each side, and if canvas is also used, this is turned back for a certain distance—one man being on each side of the bed. All the fully developed Mushrooms are then gently pulled off with the fingers, leaving the smaller ones until the next gathering—which may take place every other day, or twice a week, or even once a week only, according to the season. At one time it was thought that if the Mushrooms were cut off at the base with a sharp knife young ones would spring from the base of the old stalks. Experience, however, has proved that there is no gain in this practice, but rather a loss, as the old stump often became diseased and thus affected the surrounding Mushrooms injuriously. It is therefore better to pull the whole Mushroom than to cut it.

The beds should be re-covered immediately after each gathering, as the longer they remain uncovered the more heat is being lost. Where the beds are very long they may be 'stripped' or uncovered in sections, so that the bed is exposed for as short a time as possible.

Enemies.—The worst of these are slugs and woodlice. At every gathering a keen eye should be on the watch for these, and instant death should follow their detection. In Mushroom houses a peculiar fungus disease attacks the crop and causes the Mushrooms to become more or less distorted in shape, and worthless for edible purposes. The only remedy for this appears to be to clear out the affected portion of the bed and burn it at once. If a whole house is attacked, the contents must be removed, and to prevent future trouble it should be made into a heap and burned. The building should then be cleansed by burning brimstone in it after carefully blocking up all air chinks, and a plentiful supply of lime and soot may afterwards be sprinkled all over. The new beds should consist of fresh and clean material, and it may also be advisable to use spawn from a new source.

Mushroom Season.—Although Mushrooms may be had practically the whole year round, they are nevertheless much more plentiful some months than others. During the summer months—June, July, and August—the yield, however, is very slight, the great difficulty being to keep the outer temperature down to what has been stated as the best for the production of Mushrooms, namely 60°-65° Fahrenheit.

Making Mushroom 'Spawn.'—Although it is generally safer and better to obtain cakes or bricks of Mushroom spawn from or through nurserymen, the process of making the cakes may be briefly described here. It is dirty work and not very likely to be undertaken by amateurs.

A quantity of fresh horse and cow manure in about equal proportions is mixed with a little rich adhesive loam. The whole is well watered and mixed until it becomes like good soft mortar. It is allowed to dry gradually until it reaches the consistency of wet clay. A flat frame made of wood about an inch thick, with one, two, or more spaces, the size of the bricks required, is then filled with the compost, the work being more easily done on a flat board. Each space is well filled and packed and made smooth on each surface, and a brick of the required size and thickness is thus formed. The bricks are then spread out on their edges to dry, leaving a space between each. When a little more than half dry a hole about 1 in. across is made on one side of each brick in the centre. This hole is then filled with a piece of an old brick containing good spawn, and any crevices are filled up with the mixture used for making the bricks. Perhaps a better method is to place 5 small pieces of spawn on each new brick—one at each corner and one in the centre — and the mycelium will 'run' much quicker. The bricks thus treated may be placed face to face, the spawned side inwards, and placed on a hotbed or in a temperature of about 60° to 65° F. The spawn will soon spread over the surface of the new bricks. The latter must be frequently examined, however, so as not to allow the mycelium to advance beyond a whitish clouded appearance. If it reaches the netted or threadlike stage, it has gone too far and is likely to be useless if not used immediately. When properly clouded, the cakes may be stacked in a dry airy place with a temperature of 50° to 55° F. so that growth of the mycelium is held in suspense until the cakes are broken and used for spawning the beds as described above.

INDEX

Note.—As the species described usually follow in alphabetical order at the pages quoted after each genus, it is unnecessary to repeat them here. Synonyms, however, are printed in italics.

A

AARON'S Beard, 266, 425
Abele, 808
Abelia, 481
  rupestris, 481
Abies, 1001
  ajanensis, 996
  alba, 997, 1004
  albertiana, 999
  alcockiana, 997
  Apollinis, 1002
  arctica, 997
  atlantica, 995
  baborensis, 1004
  bifida, 1002
  brunoniana, 999
  cærulea, 997
  campylocarpa, 1003
  canadensis, 999
  Cedrus, 996
  chiloënsis, 1005
  curvifolia, 999
  denticulata, 998
  Deodara, 995
  Douglasi, 1000
  Eichleri, 1005
  Engelmanni, 997
  excelsa, 997, 1004
  Glehni, 997
  hirtella, 1004
  holophylla, 1002
  Kæmpferi, 1005
  Khutrow, 997
  leptolepis, 1006
  mariana, 998
  Mensiesii, 998
  mertensiana, 999
  nephrolepis, 1005
  nigra, 998
  orientalis, 998
  panachaica, 1002
  pattoniana, 1000
  Picea, 997, 1004
  Pichta, 1005
  Pindrow, 1005
  polita, 998
  Reginæ Amaliæ, 1002
Abies *sitchensis*, 998
  smithiana, 997
  taxifolia, 1004
  Torano, 998
  venusta, 1002
  vulgaris, 1004
  Williamsoni, 1000
  wittmanniana, 998
Abietineæ, 990
Abobra, 462
Abronia, 760
Abutilon, 278
Acacia, False, 889
  Rose, 889
Acæna, 881
Acanthaceæ, 735
Acantholimon, 601
Acanthopanax, 470
Acanthus, 736
Acer, 818
  cordifolium, 817
  dissectum, 815
  Douglasi, 814
  eriocarpum, 814
  glaucum, 314
  lævigatum, 818
  laurifolium, 815
  Opalus, 815
  polymorphum, 815
  pulchrum, 814
  sempervirens, 814
  septemlobum, 815
  spicatum, 815
  striatum, 816
  tomentosum, 814
  Trautvetteri, 817
  tripartitum, 814
  virginianum, 814
Achillea, 528
  ageratifolia, 530
  aurea, 585
  filipendula, 528
Achlamydeæ, 126
Achyranthes Verschaffelti, 764
Aciphylla, 468
Acis autumnalis, 908
  hiemalis, 908
  rosea, 908
  tricophylla, 908
Aconite, 162
  Winter, 154
Aconitum, 162
  alpinum, 168
  Fortunei, 162
  hebegynum, 168
  lupicidum, 168
  Nuttalli, 168
  pallidum, 168
  plicatum, 168
  squarrosum, 162
Acorus, 954
Acroclinium roseum, 508
Actæa, 164
  racemosa, 164
Actinella, 528
Actinidia, 267
Actinomeris, 517
Adam's Needle, 820
Adamsia scilloides, 887
Adder's Tongue Fern, 1022
Adenocarpus, 827
Adenophora, 569
Adenostoma, 870
Adiantum, 1012
Adlumia, 199
Adonis, 144
Æsculus, 811
  coccinea, 811
  macrostachya, 812
  neglecta, 811
  ohioensis, 812
  pallida, 812
  rubicunda, 811
Æthionema, 216
African Lily, 826
  Marigold, 526
Agapanthus, 826
Agaricus campestris, 1166
Agave, 916
Ageratum, 498
Agraphis nutans, 889
  patula, 840
Agrimony, Hemp, 494
Agrostemma cæli-rosa, 255
Agrostemma coronaria, 255
  flos-Jovis, 256
Agrostis, 957
Ailanthus, 299
Aira, 957
Ajuga, 759
Akebia, 179
Albumen, 25
Alchemilla, 881
Alder, 796
  Berry-bearing, 804
  Cut-leaved, 796
  Golden, 796
  Green, 797
  Grey, 796
  Hoary, 796
  Italian, 796
  Japanese, 796
  White, 796
Alexandrian Laurel, 810
Alisma, 805
Alismaceæ, 805
Alkanet, 675
All Good, 1154
All Heal, 489
Allium, 880
  Ascalonicum, 1151
  Cepa, 1148
  croceum, 880
  fistulosum, 1150
  fragrans, 880
  Porrum, 1150
  sativum, 1151
  schœnoprasum, 1161
Allosorus crispus, 1018
Allspice Tree, 172
Alme, 786
Almond, common, 857
  Silver, 861
Alnus, 796
Alona, 686
Alonsoa, 705
  compacta, 706
  pumila, 706
Aloysia citriodora, 789

Alpine plants, from seed, 99
  list of, 102
  on walls, 101
  soil for, 98
Alpine Rose, 589
Alsike, 888
Alstrœmeria, 914
  aurea, 915
  banksiana, 915
  bicolor, 915
  Flos-Martini, 915
  montana, 914
  peruviana, 915
  psittacina, 915
  triflora, 914
Alternanthera, 768
Althæa, 271
  frutex, 280
Altica nemorum, 1120
Alum, 674
Alum Root, 427
Alyssum, 210
  Sweet, 210
  utriculatum, 210
Amarantaceæ, 761
Amarantus, 762
Amaryllideæ, 893
Amaryllis, 912
  Atamasco, 909
  candida, 910
  capensis, 911
  carinata, 910
  carnea, 910
  formosissima, 910
  longifolia, 911
  lutea, 909
  montana, 914
  nivea, 910
  pudica, 912
  purpurea, 918
  rosea, 910
  speciosa, 918
  tubispatha, 910
Amber, Sweet, 266
Amberboa moschata, 551
  odorata, 551
Ambury, 1118
Amelanchier, 418
American Azaleas, 596
  Blight, 1046
  Cowslip, 625
  Cress, 1160
  Laurel, 583
    Great, 590
  Yew, 986
Ammobium, 509
Ammodendron, 852
Ammyrsine buxifolia, 584
Amorpha, 886
Ampelideæ, 807
Ampelopsis hederacea, 809
  lucida, 808
  quinquefolia, 809
  serianiæfolia, 810
  tricuspidata, 809
  triloba, 808
Ampelopsis tripartita, 808
  tuberosa, 810
  Veitchi, 809
Amsonia, 644
  latifolia, 645
Amygdalopsis Lindleyi, 868
Amygdalus argentea, 861
  besseriana, 861
  Boissieri, 858
  communis, 857
  incana, 860
  nana, 861
Anacardiaceæ, 819
Anagallis, 681
  Monelli, 681
Anagyris, 822
Anbury, 1118
Anchusa, 675
Andromeda, 578
  acuminata, 577
  arborea, 577
  axillaris, 577
  calyculata, 576
  campanulata, 580
  cassinæfolia, 578
  Catesbæi, 577
  coriacea, 579
  dealbata, 578
  fastigiata, 577
  floribunda, 579
  hypnoides, 577
  japonica, 579
  ligustrina, 578
  mariana, 579
  pulverulenta, 578
  recurva, 577
  speciosa, 578
  spicata, 577
  tetragona, 577
Androsace, 621
  Aretia, 622
  aretioides, 623
  coronopifolia, 624
  glacialis, 621
  imbricata, 621
  Lachenali, 621
  pauciflora, 623
  penicillata, 624
  puberula, 621
  vitaliana, 624
Andryala, 554
Anemiopsis californica, 774
Anemone, 139
  hortensis, 144
  hudsoniana, 142
  Japanese, 142
  pavonina, 144
  Peacock, 141
  Poppy, 140
  thalictroides, 138
  Wood, 142
Anemonopsis, 158
Angelica Tree, 470
Angel's Tears, 906
Angiosperms, 20, 88, 121
Anisanthus Cunonia, 952
  splendens, 952
Aniseed Tree, 178
Annuals, 78
  list of, 79
Anomatheca cruenta, 944
Anonaceæ, 177
Antennaria, 507
  candida, 507
Anthemis, 530
Anthericum, 825
  graminifolium, 826
  Liliastrum, 828
  pomeridianum, 828
Antheridium, 1009
Antherozoids, 1009
Antholyza, 952
  Meriana, 945
Anthomyia brassicæ, 1118
  ceparum, 1132
Anthonomus pomorum, 1046
Anthoxanthum, 958
Anthriscus cerefolium, 1160
Anthyllis, 884
Antirrhinum, 710
Apera, 958
Aphanostephus, 497
Aphides, 1081
Aphis, Woolly, 1046
  Dauci, 1129
  Fabæ, 1126
  rumicis, 1126
Aphyllanthes, 826
Apios, 851
Apium graveolens, 1130
  „ rapaceum, 1132
Apocynaceæ, 644
Apocynum, 646
Apogamy, 1010
Aponogeton, 805
Apospory, 1010
Apple, Kangaroo, 688
  Rose, 404
  Wild, 406
Apple, The, 1042
  Soil for, 1043
  Pruning, 1043
  Training, 1043
  Protection, 1043
  Thinning fruit, 1044
  Propagation of, 1044
  Packing, 1044
  Gathering, 1044
  List of sorts, 1049
Apple Blossom Weevil, 1046
  Mussel scale, 1047
Apricot, 358, 1083
  varieties to grow, 1084
Aquilegia, 155
  Arctica, 156
  bicolor, 157
  californica, 156
Aquilegia *eximia*, 156
  garnieriana, 157
  leptoceras, 156
  macrantha, 156
  Reuteri, 156
  speciosa, 157
Arabis, 205
  caucasica, 205
Aralia, 469
  cordata, 470
  macrophylla, 470
  Maximowiczi, 470
  papyrifera, 471
  pentaphylla, 470
  Sieboldi, 471
Araliaceæ, 469
Arar Tree, 975
Araucaria, 989
  tribe, 988
Arbor Vitæ, 976
  American, 976
  Chinese, 977
  Weeping, 977
Arbutus, 574
  alpina, 575
  mucronata, 575
  Uva-ursi, 575
Archegonium, 1009
Arctostaphylos, 575
Arctotideæ, 544
Arctotis, 545
  anthemoides, 544
Arenaria, 259
Argemone, 198
Aristolochia, 773
Aristolochiaceæ, 773
Aristotelia, 282
Armeniaca Brigantiaca, 858
  dasycarpa, 859
  vulgaris, 858
Armeria, 608
Arnebia, 679
Arnica, 539
  Clusi, 540
Aroideæ, 958
Aromatic Winter Green, 575
Aronicum scorpioides, 540
Arrow Arum, 954
  Head, 806
  Wood, American, 479
Artemisia, 538
  Dracunculus, 1165
Artichoke, Globe, 1141
  Jerusalem, 1140
Arum, 958
  Arrow, 954
  Lily, 955
  sanctum, 954
Arundinaria, 965
  kurilensis paniculata, 968
Arundo, 958
Asarabacca, 772
Asarum, 772
Asclepiadeæ, 646

Asclepias, 647
  Cornuti, 648
Ash, 640
  Curl-leaved, 640
  Flowering, 640
  Manna, 640
  Mountain, 405
  Prickly, 296
  Weeping, 640
  White, 640
Asimina, 177
Asparagus, 1145
  Broccoli, 1117
Aspen, 804
  American, 804
Asperula, 487
  azurea setosa, 487
Asphodel, 822
  Bog, 877
Asphodeline, 828
Asphodelus, 822
  luteus, 828
Aspidiotus conchiformis, 1047
Aspidium, 1018
  alpestre, 1020
  Filix-mas, 1019
  rigidum, 1019
  Thelypteris, 1020
Asplenium, 1014
Assimilation, 84
Aster, 500
  China, 499
  sinensis, 499
  Stokes's, 498
Asteroideæ, 495
Astilbe, 414
Astrantia, 466
  maxima, 467
Astragalus, 842
  danicus, 848
  virescens, 848
Athalia spinarum, 1120
Athyrium alpestre, 1020
  filix-fœmina, 1015
Atragene alpina, 182
  americana, 186
  austriaca, 182
  sibirica, 182
Atriplex hortensis, 1158
Atropa Belladonna, 687
Aubrietia, 208
Aucuba, 475
Aume Tree, 786
Auricula, 606, 618
  Alpine, 619
Autumn tints, 110
Avens, 874
  Mountain, 874
  Water, 875
Axe weed, 885
Azalea, 598
  American, 596
  amœna, 594
  balsaminæflora, 594
  Ghent, 596
Azalea, Honeysuckle, 596
  liliiflora, 594
  mollis, 595
  obtusa, 594
  procumbens, 582
Azara, 235

B

BABIANA, 945
Baboon Root, 945
Bachelor's Buttons, 146, 256
  White, 146
Bæria, 524
Bahia, 524
Balbisia, 292
Balm, 746
  Bastard, 754
  Bee, 750
  of Gilead, 758
Balsam, Common, 294
Balsamina hortensis, 294
Bamboos, Hardy, 964
Bambusa, 968
  albo-marginata, 968
  aurea, 969
  Castillonis, 969
  chrysantha, 966
  erecta, 966
  falcata, 966
  fastuosa, 969
  flexuosa, 969
  Fortunei aurea, 966
  Fortunei variegata, 966
  Henonis, 970
  Hermanni, 967
  heterocycla, 970
  Laydekeri, , 967
  Marliacea, 970
  Mazeli, 970
  Metake, 967
  mitis, 970
  nana, 968
  nigra, 970
  nigro-punctata, 970
  palmata, 967
  pumila, 967
  pygmæa, 967
  Quilioi, 970
  Ragamowski, 969
  ruscifolia, 970
  Simoni, 968
  sulphurea, 970
  Veitchi, 968
  Vilmorini, 968
  viminalis, 970
  violescens, 971
  viridi-glaucescens, 971
Banana, 888
Band Plant, 645
Baneberry, 164
Baptisia, 323
Barbarea, 205, 1160
Barberry, 180
Barcelona Nut, 798
Barkhausia rubra, 558
Barrenwort, 183
Bartonia albescens, 458
  aurea, 458
  decapetala, 458
Basic slag, 73
Basil, 1160
  Bush, 1160
Basswood, American, 281
Bastard Balm, 754
  Box, 237
  Indigo, 336
Batschia canescens, 678
  Gmelini, 679
Bay Laurel, 775
  Tree, Californian, 775
  Willow, 808
Bayonet Plant, 468
Bead Plant, 488
Beam tree, White, 405
  Himalayan, 407
Bean Tree, 854
Beans, Broad, 1125
  Climbing, 1127
  French, 1126
  Kidney, 1126
  Runner, 1127
Bearberry, 575
Bearbind, 684
Beard Tongue, 712
Bear's Breech, 736
  Ear Sanicle, 624
  Foot, 152
Bee Balm, 750
  Orchis, 892
Beech, Common, 801
  Copper, 801
  Evergreen, 801
  Fern, 1020
  Purple, 801
  Weeping, 802
Beef Suet Tree, 781
Beetroot, 766, 1151
Beet, Spinach, 1152
Begonia, 462
Begoniaceæ, 462
Bell Flower, 562
  Chimney, 567
  Chinese, 559
Belladonna Lily, 912
Bellidiastrum Michelli, 502
Bellis, 498
Bellium, 498
Bellwort, 879
Belvedere Cypress, 766
Bent Grass, 957
Benthamia fragifera, 474
  japonica, 474
Berberideæ, 178
Berberidopsis, 180
Berberis, 180
  Beali, 181
Berberis *dulcis*, 181
  intermedia, 181
  macrophylla, 180
Berchemia, 804
Bergamot, Wild, 750
Berkheya, 546
Beta, 766
  vulgaris, 1151
Bethroot, 880
Betonica grandiflora, 755
Betula, 793
Bidens, 522
Biennials, 78
Bignonia, 781
  grandiflora, 783
  Pandorea, 783
  radicans, 783
Bignoniaceæ, 781
Bilberry, 572
Bindweed, 685
Biota orientalis, 977
  pendula, 977
Biotia corymbosa, 500
Birch, 793
  Canoe, 795
  Common, 794
  Paper, 795
  Red, 795
  Silver, 794
  Sweet Cherry, 795
  White, 794
    Canadian, 795
  Yellow, 795
Bird Cherry, 861
Bird's-foot Trefoil, 835
Birthroot, 880
Birthwort, 778
Bistort, 768
Bitternut, 791
Bitter-Sweet, 808
Bitter Vetch, 850
Bivonæa, 216
Bixineæ, 285
Blackberry, 872
  Bryony, 884
  Dogwood, 304
  Dolphin, 1126
  Fly, 1126
  Gum, 477
  Haw, 480
  Palmer's, 1120
  Raspberry, 873
  Root, 678
  Snakeroot, 164
  Spruce, 998
  Thorn, 859
Bladder Campion, 252
  Fern, 1017
  Ketmia, 280
  Nut, 818
  Pod, 209
  Senna, 840
Blanket Flower, 527
Blechnum boreale, 1018
  Spicant, 1018
Bleeding Heart, 198
Bleeding, 28
Blessed Thistle, 551

Blight, Collier, 1126
Blitum capitatum, 765
Blood Root, 195
Bloomeria, 830
Bluebell, 568, 838
  Californian, 667
  Common, 839
  Italian, 840
  Spanish, 840
Blueberry, 572
Blue Bottle, 550
Blue Daisy of Morocco, 498
Blue-eyed Grass, 948
Bluet, 550
Bluets, 487, 578
Blumenbachia, 459
Bobartia aurantiaca, 948
Bocconia, 195
  japonica, 195
Bœnninghausenia albiflora, 295
Bog Asphodel, 877
  Bean, 657
  Myrtle, 798
  Pimpernel, 682
  Plants, 112
  Violet, 729
Boleum, 221
Boltonia, 499
Bombyx neustria, 1048
Bone manure, 73
Bongardia, 182
Boon Tree, 478
Borage, 674
Boragineæ, 670
Borago, 674
Bordeaux mixture, 1186
Borecole, 1116
Botrychium, 1028
Box, 783
  Bastard, 287
  Elder, 815
  Flowering, 578
Box-Thorn, 691
Brachycome, 497
Bracken, 1018
Brake, 1018
  Rock, 1018
Bramble, 872
Brandy Bottle, 185
Brassica oleracea acephala, 1116
Brassica oleracea botrytis asparagoides, 1116
Brassica oleracea botrytis cauliflora, 1117
Brassica oleracea bullata, 1115
Brassica oleracea bullata gemmifera, 1115
Brassica oleracea capitata, 1114
Brassica oleracea Caulo-rapa, 1118
Brassica Rapa, 1119
Bravoa, 916
Brawlins, 578
Breakstone, 415
Brevoortia, 827
Briar, Austrian, 402
  Persian, 402
  Sweet, Hybrid, 898
Bridgesia spicata, 767
Bristle Fern, 1022
Briza, 959
Broccoli, 1116
  Asparagus, 1117
Brodiæa, 827
  coccinea, 827
Brome Grass, 959
Brompton Stock, 202
Bromus, 959
Brook-weed, 682
Broom, 830
  Common, 832
  Purple, 832
  Rock, 828
  Spanish, 830
Brotherwort, 745
Broussonetia, 788
Browallia, 701
Brugmansia candida, 698
  sanguinea, 694
  suaveolens, 694
Brunella, 754
Brussels Sprouts, 1115
Bryanthus, 582
Bryonia, 461
Bryonopsis erythrocarpa, 461
Bryony, 461
  Black, 884
Buck Bean, 657
Buck-eye, 811
  Red, 812
  Sweet, 811
Buckler Fern, 1019
  Broad, 1019
  Hay-scented, 1019
  Male, 1019
  Marsh, 1020
Buckthorn, 804
  Sea, 781
Budding, 58
Buddleia, 649
Buffalo Berry, 781
Bugbane, 164
Bugle, 759
Bugle Lily, 945
Bugloss, 680
  Viper's, 681
Bugwort, 164
Bulbinella Hookeri, 826
Bulbocodium, 877
  autumnale, 877
  trigynum, 877
Bulbous plants, 95
Bullace, 810, 1074
Bullock's Eye, 448
Bulrush, 972
Bunch Berry, 474
  Grass, 959
Buphthalmum, 510
Bupleurum, 467
Bur Marigold, 522
  Reed, 958
  Tree, 478
Burgundy Pitch-tree, 997
Burning Bush, 296, 801
Bursaria, 287
Butcher's Broom, 810
Butomus, 806
Butter-bur, 539
Buttercup, 146
Butterfly Flower, 699
  Weed, 648
Butternut, 791
Butter-root, 729
Butterwort, 728
  Irish, 728
  Scottish, 728
Buttonwood, 789
Buxus, 783

C

CABBAGE, 1114
  Autumn, 1114
  Caterpillar, 1118
  Cutting, 1114
  Fly, 1118
  Gall Weevils, 1118
  Moth, 1118
  Pickling, 1115
  Portugal, 1115
  Savoy, 1115
  Spring, 1114
  Turnip-rooted, 1119
  Varieties of, 1115
Cacteæ, 468
Cactus, Whip, 468
Cæsalpineæ, 358
Cæsalpinia, 358
Caiophora coronata, 459
Caladium virginicum, 954
Calamint, 746
Calamintha, 746
Calampelis scabra, 784
Calandrinia, 261
Calceolaria, 708
Calendula officinalis, 544
  pluvialis, 544
Calendulaceæ, 548
Calico Bush, 588
Californian Fire Cracker, 827
  Hyacinth, 827
  Nutmeg, 987
  Redwood, 984
Calla, 955
  æthiopica, 955
Callichroa platyglossa, 524
Calliopsis, 518
Calliprora lutea, 829
Callirhoe, 275
  spicata, 277
Callistephus, 499
Callitris, 975
Calluna, 580
Calochortus, 872
  umbellatus, 874
Calophaca, 842
Calopogon, 891
Caltha, 150
Calycanthaceæ, 172
Calycanthus, 172
Calycifloræ, 124, 322
Calypso, 890
Calystegia, 684
Camassia, 841
Cambium-layer, 30, 55
Camellia, 269
Campanula, 562
  Barrelieri, 564
  Burghalti, 565
  capensis, 558
  capillaris, 558
  celtidifolia, 565
  dahurica, 564
  floribunda, 564
  G. F. Wilson, 567
  hederacea, 558
  Loreyi, 567
  modesta, 567
  muralis, 567
  nana, 563
  planiflora, 566
  pumila, 567
  rhomboidea, 567
  serpyllifolia, 559
  spathulata, 568
  turbinata, 563
  Van Houttei, 565
  Wanneri, 570
Campanulaceæ, 555
Campanuleæ, 557
Campernelle Jonquil, 902
Campion, 250
  Bladder, 252
  Red, 256
  Rose, 255
  White, 257
Canada Tea, 576
Cancer wort, 724
Candleberry Myrtle, 798
Candytuft, 218
  Evergreen, 219
  Rock, 219
  Rocket, 218
Canker, 1047
Canna, 885
Cannabis, 788
Canterbury Bell, 566
Cape Figwort, 711
  Hyacinth, 881
  Jessamine, 646
  Marigold, 548
Caper Spurge, 788
Caprifoliaceæ, 477
Caragana, 841
  Altagana, 842

Carbenia, 551
Cardamine, 207
Cardinal Flower, 556
Cardoon, 1142
Carex, 971
Carlina, 547
Carnation, 240
  diseases, 243
  maggot, 248
  Marguerite, 241
  rust, 243
Carob Tree, 854
Carolina Allspice, 172
Carpenteria, 434
Carpet Juniper, 982
Carpinus, 797
Carpocapsa funebrana, 1071
  pomonana, 1047
Carrion Flower, 809
Carrot, The, 1128
  storing, 1128
Carthamus, 551
Carum Petroselinum, 1132
Carya, 790
Caryophylleæ, 238
Caryopteris, 742
Cassandra, 576
Cassia, 854
Cassinia, 509
Cassiope, 576
Castanea, 800
Castor Oil Plant, 784
Catalpa, 782
Catananche, 553
Catchfly, 250
  German, 258
  Nottingham, 253
  Pigmy, 253
  Royal, 254
Caterpillars, Social, 1048
Cat Mint, 750
  Thyme, 758
  Whin, 330
Cat's Tail, 458
  Valerian, 489
Cathcartia, 194
Cauliflower, 1117
  blindness, 1118
  buttoning, 1118
Caulophyllum, 183
Ceanothus, 805
  bicolor, 805
  cæruleus, 805
  elegans, 806
  lobbianus, 805
  ovalis, 806
  verrucosus, 805
Cecidomyia nigra, 1062
Cedar, 995
  Atlas, 995
  of Goa, 978
  Incense, 975
  Indian or Deodar, 995
  Japan, 982
  of Lebanon, 996
Cedar—
  Port Orford, 978
  Red, 982
  Silver, 982
  Stinking, 987
  White, 976
Cedronella, 752
Cedrus, 995
  africana, 995
  indica, 995
  patula, 996
Celandine, 196
  Lesser, 149
Celastrineæ, 801
Celastrus, 802
Celeriac, 1132
Celery, 1130
  Fly, 1129, 1131
  Turnip-rooted, 1132
Celosia, 762
Celsia, 702
Celtis, 787
  cordata, 787
  crassifolia, 787
Centaurea, 549
  candidissima, 549
Centauridium Drummondi, 496
Centaury, 549
  Little, 651
Centranthus, 489
Cephalanthus, 486
Cephalaria, 491
Cephalotaxus, 985
  coriacea, 985
  filiformis, 985
  fœminea, 985
  mascula, 985
  pendula, 985
  tardiva, 985
  umbraculifera, 987
Cerastium, 258
Cerasus, 857
  acida, 857
  Avium, 858
  caproniana, 859
  Chamæcerasus, 859
  demissa, 859
  depressa, 862
  glauca, 862
  ilicifolia, 860
  Laurocerasus, 860
  lusitanica, 860
  Mahaleb, 860
  mollis, 861
  myrobalanos, 859
  Padus, 861
  pendula, 861
  serrulata, 862
  Sieboldi, 862
  virginiana, 863
  vulgaris, 859
Ceratocaulos daturoides, 698
Ceratonia, 854
Ceratostigma plumbaginoides, 604
Cercis, 855
Cereus flagelliformis, 463
Cerinthe, 682
Ceterach officinarum, 1015
Ceutorrhynchus sulicollis, 1118
Chænostoma, 719
Chærophyllum bulbosum, 1161
Chain Fern, 1018
Chamæbatia, 878
Chamæbatiaria millefolium, 867
Chamæcyparis nutkaënsis, 979
  obtusa, 979
  pisifera, 979
  sphæroidea, 980
Chamælirium, 877
Chamæpeuce, 548
Chamærops excelsa, 956
Chamomile, 580
  Ox-Eye, 580
Chards, 1141
Charieis, 498
Charity, 665
Charlemagne'sThistle, 547
Chaste-tree, 741
Cheimatobia brumata, 1062
Cheiranthus, 204
  alpinus, 214
  capitatus, 204
  ochroleucus, 215
Chelidonium, 196
  japonicum, 195
Chelone, 712
  barbata, 713
  campanulata, 714
  centranthifolia, 714
  Digitalis, 714
  glabra, 712
  major, 712
  Pentstemon, 716
  purpurea, 712
  ruelloides, 713
Chenopodiaceæ, 765
Chenopodium, 765
  Bonus - Henricus, 1158
Cherokee Rose, 402
Cherry, 858, 1075
  Bastard, 862
  Bird, 861
  Choke, 863
  Crab, Siberian, 406
  Double Chinese, 862
  Ground, 859
  Pie, 670
  stocks, 1075
  varieties to grow, 1076
  Wild or Dwarf, 859
  Winter, 690
Cherry-Laurel, 860
Chervil, 1160
  Bulbous, 1161
  Turnip-rooted, 1161
Chestnut, Horse, 812
  Sweet, 800
Chickweed, Mouse-Ear, 258
Chicory, 1144
Chimaphila, 598
Chimonanthus, 172
China Aster, 499
  Fir, 988
  Root, American, 808
Chinaman's Breeches, 199
Chinese Lanterns, 690
  Pink, 248
Chionodoxa, 837
Chionographis, 878
Chiono-Scilla, 838
Chittam Wood, 819
Chives, 1161
Chlora, 651
Chlorogalum, 828
  Leichtlini, 841
Chlorophyll, 38, 40
Choisya, 296
Chokeberry, 405
Choke Cherry, 863
Christ's Thorn, 803
Christmas Rose, 152
  Tree, 997
Chrysanthemum, 531
  decaisneanum, 536
  marginatum, 536
  tricolor, 531
Chrysobactron Hookeri, 826
  Rossi, 826
Chrysocoma Linosyris, 502
Chrysogonum, 511
Chrysurus cynosuroides, 961
Chymocarpus pentaphyllus, 291
Cichoriaceæ, 552
Cichorium Endivia, 1148
  Intybus, 1144
Cigar Plant, 450
Cimicifuga, 164
  serpentaria, 164
Cineraria maritima, 541
Cinquefoil, 376
Cirsium altissimum, 548
Cissus davidiana, 809
  japonica, 809
  platanifolia, 809
  rubricaulis, 809
  viticifolia, 810
Cistineæ, 223
Cistus, 223
  corbariensis, 225
  cordifolius, 225
  formosus, 226
  Ground, 584
  incanus, 225
  tomentosus, 227
  undulatus, 225
Citrus, 298

Cladosporium dendriticum, 1048
  fulvum, 1139
Cladrastis, 852
Clarkia, 452
Clary, 749
Claytonia, 262
Cleistogamous, 228
Clematis, 181
  Addisoni, 186
  anemonæflora, 184
  azurea, 182
  balearica, 182
  coloradensis, 185
  cylindrica, 183
  davidiana, 183
  Durandi, 184
  erecta, 185
  eriostemon, 183
  graveolens, 184
  Hookeri, 183
  hybrid, 186
  Jackmanni, 186
  Pieroti, 182
  Simsi, 183
  texensis, 182
  tubulosa, 183
Clerodendron, 741
Clethra, 596
Clianthus, 840
Climbing Waxwork, 808
Clintonia, 879
  pulchella, 555
Cloudberry, 872
Cloud Grass, 957
Clove, 240
Clover, Bastard, 883
  Brown, 884
  Buffalo, 884
  Crimson, 884
  Owl-headed, 883
  Prairie, 886
Clubmoss, 1024
Club Palm, 822
  Root, 1118
  Rush, 953
Cnicus, 548
  benedictus, 551
Cob Nut, 797, 1099
Cobæa, 666
Coburgia Belladonna, 912
Cocculus, 178
Cochlearia, 1162
Cockscomb, 762
Cock's Foot Grass, 959
Coco-nut, 956
  Double, 956
Cocos nucifera, 956
Codlin moth, 1047
Codlins and Cream, 452
Codonopsis, 559
Coffee Tree, Kentucky, 858
Colchicum, 875
  Agrippinum, 876
  bulbocodioides, 876
Colchicum—
  chionense, 876
Cold frames, 47, 100
Coleus, 743
Coleworts, 1115
Collards, 1115
Colletia, 806
  serratifolia, 807
Collier Blight, 1126
Collinsia, 717
Collomia, 668
  Cavanillesi, 668
Coltsfoot, 589
Columbine, 155
  Feathered, 188
Colutea, 840
  orientalis, 841
  sanguinea, 841
Comfrey, 673
  Prickly, 678
Commelina, 807
Commelinaceæ, 807
Compass Plant, 511
Compositæ, 492
Composite Crops, 1140
Comptonia asplenifolia, 798
Conandron, 780
Cone Flower, 514
Coniferæ, 972
Convallaria, 813
  bifolia, 818
  multiflora, 811
  oppositifolia, 812
  Polygonatum, 812
  racemosa, 813
  stellata, 818
  verticillata, 812
Convolvulaceæ, 682
Convolvulus, 685
  argenteus, 685
  candicans, 688
  major, 688
  panduratus, 688
  purpurea, 683
Coptis, 154
Coral-berry, 481
  tree, 851
Corbularia Bulbocodium, 897
  serotina, 897
Cordyline, 822
Corema, 805
Coreopsis, 518
  angustifolia, 515
  bicolor, 519
  maritima, 519
  tenuifolia, 519
Coriaria, 821
Coriarieæ, 821
Coris, 682
Corn Flag, 947
  Marigold, 585
  Poppy, 192
  Salad, 1161
  Violet, 569
Cornaceæ, 473
Cornel, 473
  Dwarf, 474
Cornelian Cherry, 474
Cornflower, 550
Cornus, 473
  Baileyi, 475
  brachypoda, 474
  mascula, 474
  officinalis, 475
Coronilla, 844
  Securidacea, 835
Cortaderia, 960
Cortusa, 624
Corydalis, 199
  bulbosa, 200
  fungosa, 199
  tuberosa, 199
Corylopsis, 444
Corylus, 797
Cosmanthus grandiflorus, 668
Cosmidium burridgeanum, 522
Cosmos, 522
  diversifolius, 522
Cossus ligniperda, 1062
Cotoneaster, 410
  reflexa, 411
  vulgaris, 410
Cotton Thistle, 548
  Weed, 580
Cotyledon, 437
Cotyledons, 25
Countryman'sTreacle 295
Couve Tronchuda, 1115
Cow Bell, 252
  Parsnip, 469
Cowberry, 578
Cowherb, 250
Cowslip, American, 625
  Blue, 675
  Common, 618
  Royal, 610
  Virginian, 676
Crab, 406
  Cherry, 406
  Siberian, 407
  Stock, 1045
  Sweet-scented, 406
  Toringo, 406
'Cracking' of Fruits, 1048
Crakeberry, 805
Crambe, 221
  maritima, 1121
Cranberry, 578
  American, 578
  Tree, 480
Crane Fly, 1129
Cranesbill, 285
Craniolaria fragrans, 785
Crassulaceæ, 437
Cratægus, 408
  arbutifolia, 412
  Aronia, 409
  caroliniana, 408
  carpatica, 409
Cratægus—
  Chamæmespilus,406
  glabra, 412
  glandulosa, 406
  lucida, 408
  maroccana, 409
  populifolia, 406
  sanguinea, 409
Creeping Jenny, 629
  Sailor, 425
Crepis, 553
Cress, 1161
  American, 205, 1160
  Indian, 290
  Rock, 205
  Rocket, 216
  Violet, 216
  Wall, 205
  Water, 1166
Crimson Flag, 943
Crinum, 911
'Crocking' pots, 26
Crocosma, 945
Crocus, 936
  algeriensis, 940
  atlanticus, 940
  Autumn-flowering, 937
  byzantinus, 939
  Cloth of silver, 936
  „ gold, 941
  fimbriatus, 940
  fragrans, 942
  insularis, 939
  lagenæflorus, 938
  mœsiacus, 938
  multifidus, 940
  nivalis, 941
  pyrenæus, 940
  revolutus, 941
  Saffron, 941
  Scotch, 938
  Spring, 942
  Spring-flowering, 936
  sublimis, 941
  variegatus, 940
  veluchensis, 938
Crops, Rotation of, 1104
  Composite, 1140
  Cruciferous, 1113
  Leguminous, 1123
  Liliaceous, 1145
  Solanaceous, 1133
  Umbelliferous, 1128
Crosnes, 1159
Crosses, 19
Cross-wort, 488
Crowberry, 805
  Brown, 805
Crowfoot, 146
  Anemone, 146
  Snowy, 146
Crown Beard, 517
  Daisy, 581
  Imperial, 858
Crucianella, 488
Cruciferæ, 201

Cruciferous crops, 1118
  diseases of, 1118
Cryptogams, 121
Cryptogramme, 1018
Cryptomeria, 982
Cuckoo Flower, 207, 256
  Pint, 958
Cucumber, 1156
  Ridge, 1158
  Tree, 174
Cucumis Melo, 1158
  sativus, 1156
Cucurbita Pepo, 1155
Cucurbitaceæ, 460
Cudweed, 507
Culver's Physic, 727
Cunninghamia, 988
Cup Plant, 511
Cuphea, 450
  cyanea, 450
  jorullensis, 450
  platycentra, 450
Cupressineæ, 975
Cupressus, 977
  amœna, 978
  californica, 978
  cashmeriensis, 980
  cornuta, 978
  Coulteri, 978
  disticha, 988
  fastigiata, 979
  fragrans, 978
  glandulosa, 978
  glauca, 978
  Hartwegi, 979
  japonica, 982
  karwinskiana, 978
  knightiana, 978
  lambertiana fastigiata, 979
  nepalensis, 980
  nivalis, 978
  pendula, 978
  pyramidalis, 979
  Reinwardti, 979
  whitleyana, 979
Cups and Saucers, 666
Cupuliferæ, 798
Currant, The, 1095
  Buffalo, 486
  Flowering, 487
  Fuchsia-flowered, 487
  mite, 1096
  varieties to grow, 1096
Custard Apple Order, 177
Cut Finger, 645
Cuttings, propagation by, 48
  of roots, 51
  of leaves, 52
  selecting, 49
  soil for, 52
Cyananthus, 560
Cyclamen, 626
  æstivum, 628
Cyclamen—
  autumnale, 627
  balearicum, 628
  caucasicum, 627
  cordifolium, 628
  cyprinum, 628
  elegans, 627
  ficariifolium, 628
  hederæfolium, 628
  hybridum, 627
  hyemale, 627
  immaculatum, 628
  latifolium, 628
  odoratum, 628
  robustum, 627
  romanum, 628
  vernale, 627
Cyclobothra pulchella, 875
Cydonia japonica, 406
  Maulei, 407
  vulgaris, 407
Cynara Scolymus, 1141
  Cardunculus, 1142
Cynaroideæ, 547
Cynoglossum, 672
  longiflorum, 672
  Omphalodes, 672
Cyperaceæ, 971
Cyperus, 971
Cyphomandra, 690
Cypress, 977
  Alaska, 979
  Belvedere, 766
  Cedar, 996
  Deciduous, 988
  Embossed, 988
  Funeral, 978
  Lawson's, 978
  Monterey, 979
  Montezuma, 988
  Spurge, 788
  Tribe, 975
Cypripedium, 892
Cystopteris, 1017
Cytisus, 880
  alpinus, 827
  elongatus, 831
  False, 216
  græcus, 834
  Laburnum, 828
  Weldeni, 828
Czackia Liliastrum, 828

D

DABŒCIA, 582
Dacrydium, 987
Dactylis, 959
Daffodil, 893
  Ajax, 903
  Butter and Eggs, 899
  Codlins and Cream, 900
  Cyclamen, 898
  Eggs and Bacon, 900
  Great Spanish, 901
Daffodil—
  Hooped Petticoat, 897
  Medusa Trumpet, 897
  Orange Phœnix, 899
  Primrose Peerless, 897
  Star, 898
  Tenby, 901
  Trumpet, 903
  Winter, 909
Dahlia, 519
  bidentifolia, 521
  Black, 522
  crocata, 521
  glabrata, 521
  superflua, 521
Daisy, Common, 498
  Crown, 531
  Hen-and-Chickens, 498
  Michaelmas, 500
  of Morocco, Blue, 498
  Ox Eye, 534
    Great, 535
  Paris, 532
  Swan River, 497
  Tree, 504
Dame's Violet, 218
Damson, The, 1075
Danæa, 810
Dane's Blood, 477
Daphne, 777
  collina, 779
  fioniana, 778
  rupestris, 778
Daphniphyllum, 784
Date Palm, 956
  Plum, 632
    Virginian, 633
Datura, 692
  flava, 693
  humilis, 693
  Wrighti, 693
Daucus Carota, 1128
David's Harp, 811
Dawson Rose, 408
Day Lily, 815
Deadly Nightshade, 687
Deadnettle, 756
Decumaria, 482
Deer Grass, 449
Deerberry, 573
Delphinium, 158
  elatum, 160
  pictum, 161
  sulphureum, 162
Dendromecon, 196
Deodar, 995
Deschampsia cæspitosa, 957
  flexuosa, 957
Desfontainia, 650
Desmodium penduliflorum, 346
Deutzia, 481
  Fortunei, 481
Deutzia *scabra*, 481
Devil-in-a-Bush, 155
Devil's Fig, 198
  Horns, 735
Dianthera, 787
Dianthus, 238
  Atkinsoni, 248
  Balbisi, 245
  Heddewegi, 248
Diapensia, 599
Diapensiaceæ, 599
Diascia, 706
Dicentra, 198
Dicotyledons, 80, 122
Dictamnus, 296
Didiscus cæruleus, 465
Dielytra, 198
Dierama, 948
Diervilla, 485
  amabilis, 485
  canadensis, 486
Digging, 63
  double, 65
Digitalis, 722
  grandiflora, 722
  ochroleuca, 722
Digraphis arundinacea, 968
Dimorphanthus mandschuricus, 470
Dimorphotheca, 548
Dionæa, 444
Dioscoreaceæ, 884
Diospyros, 628
Diotis, 530
Diphylleia, 184
Diplacus cardinalis, 720
Diplopappus chrysophyllus, 509
  leptophyllus, 509
Diplosis pyrivora, 1062
Dipsaceæ, 490
Dipsacus, 491
Dirca, 779
Disbudding, 1084
Discaria, 307
Disciflorae, 123, 284
Dittany, 296
  Cretan, 745
Dockmackie, 478
Dodecatheon, 625
Dog's Bane, 646
Dogberry, 475
Dog Rowan Tree, 480
Dogstooth Violet, 869
Dogwood, Black, 304
  Common, 475
  Flowering, 474
  Red Osier, 475
  Round-leaved, 474
  Swamp, 297
  White-fruited, 478
Dondia Epipactis, 467
Donia squarrosa, 496
Doronicum, 540
Dorycnium, 335

Double Tongue, 810
Doucin Stock, 1045
Douglas Fir, 1000
Douglasia, 624
Dovedale Moss, 422
Downingia, 555
Draba, 211
  ***ciliaris*, 212**
Dracocephalum, 751
  ***canariense*, 753**
  ***cordatum*, 753**
  ***speciosum*, 754**
  ***variegatum*, 754**
  ***virginianum*, 754**
***Dracopis amplexicaulis*, 514**
***Dracunculus vulgaris*, 954**
Dragon's Head, 751
  Mouth, 953
  Plant, 954
Drainage, 45, 66
Drimys, 173
Dropwort, 864
Drosera, 444
Droseraceæ, 443
Drosophyllum, 444
Dryas, 374
Drypis, 247
Duke of Argyle's Tea Plant, 692
Dusty Miller, 619
Dutchman's Pipe, 773

E

EBENACEÆ, 682
Eccremocarpus, 734
***Echeveria*, 437**
***Echinacea angustifolia*, 515**
  ***purpurea*, 515**
Echinops, 547
Echium, 680
Edelweiss, 507
***Edraianthus*, 558**
  ***tenuifolius*, 559**
***Edwardsia tetraptera*, 358**
Eel-worm, 1158
Egg-cell, 6
Eglantine, 404
Eichornia, 883
Elæagnaceæ, 779
Elæagnus, 779
  ***canadensis*, 780**
  ***crispa*, 780**
  ***edulis*, 780**
  ***odoratc. edulis*, 780**
  ***parvifolia*, 780**
  ***reflexa*, 780**
  ***rotundifolia*, 780**
Elder, 477
  Common, 478
  Dwarf, 477
  Golden, 478
  Hart's, 478
  Parsley-leaved, 478
  Scarlet-berried, 478
Elecampane, 510
Elm, 785
  American, 786
  Common, 786
  Cornish, 786
  Exeter, 786
  Ford's, 786
  Huntingdon, 786
  Irish, 786
  Red, 786
  Scotch, 786
  Slippery, 786
  Variegated, 786
  White, 786
  Winged, 786
  Wych, 786
Elymus, 959
Embothrium, 776
Embryo-sac, 6
Emmenanthe, 669
Empetraceæ, 804
Empetrum, 805
  ***Conradi*, 805**
  ***lusitanicum*, 805**
Endive, 1142
Endosmosis, 23
English Iris, 934
Enkianthus, 579
Eomecon, 195
Ephedra, 978
Epigæa, 578
Epilobium, 451
  ***angustissimum*, 452**
  ***Halleri*, 452**
Epimedium, 183
  ***grandiflorum*, 184**
Equisetaceæ, 1023
Equisetum, 1023
Eranthis, 154
Ercilla, 767
Eremostachys, 757
Eremurus, 824
  ***caucasicus*, 825**
Erianthus, 960
Erica, 580
  ***codonodes*, 581**
  ***hibernica*, 581**
  ***maweana*, 582**
  ***sicula*, 580**
  ***vulgaris*, 580**
Ericaceæ, 574
Erigeron, 505
Erinus, 723
  ***lychnidea*, 718**
  ***selaginoides*, 718**
***Eriobotrya japonica*, 412**
***Eriocampa limacina*, 1048**
Eriogonum, 768
***Eriophyllum cæspitosum*, 525**
  ***confertiflorum*, 525**
Eritrichium, 678
Erodium, 287
  ***glandulosum*, 287**
  ***trilobatum*, 287**
***Erpetion hederaceum*, 229**
  ***reniforme*, 229**
Eryngo, 465
Erysimum, 214
Erythræa, 651
Erythrina, 351
***Erythrochæte palmatifida*, 542**
Erythronium, 869
Escallonia, 434
  ***affinis*, 435**
  ***floribunda*, 435**
Eschscholtzia, 197
Eucalyptus, 447
Eucharidium, 455
***Eucnide bartonioides*, 458**
Eucomis, 838
Eucryphia, 371
***Eugenia Ugni*, 449**
***Eulalia gracillima*, 962**
  ***japonica*, 962**
Eunomia, 217
Euonymus, 301
Eupatorieæ, 493
Eupatorium, 494
Euphorbia, 782
Euphorbiaceæ, 782
***Eurybia gunniana*, 505**
  ***ramulosa*, 505**
  ***Traversi*, 505**
Euscaphis, 318
***Euthamia graminifolia*, 497**
***Eutoca divaricata*, 668**
  ***multiflora*, 668**
  ***sericea*, 668**
  ***speciosa*, 668**
  ***viscida*, 669**
  ***wrangeliana*, 668**
Eve's Cushion, 422
Evening Primrose, 453
Everlasting Flowers, 507, 508, 510, 547
  Pearl, 507
  Yellow, 508
***Exoascus deformans*, 1080**
Exochorda, 369

F

***FABA vulgaris*, 1125**
Fabiana, 695
Fagus, 801
Fair Maids of France, 146, 421
  Kent, 146
Fairy Thimble, 722
Fallugia, 374
False Indigo, 323
  Mitrewort, 426
  Quince, 406
  Spikenard, 813
***Farfugium grande*, 542**
Farkleberry, 572
Farmyard manure, 74
Farsetia, 208
Fatsia, 471
Featherfoil, 604
Feather Grass, 963
Fedia, 490
Felwort, 652
Fen Rue, 138
Fennel, 468
  Flower, 155
  Giant, 468
***Fenzlia dianthiflora*, 664**
Fern, Adder's Tongue, 1022
  Beech, 1020
  Bladder, 1017
  Brake, 1013
  Bristle, 1022
  Buckler, 1019
  Chain, 1013
  Filmy, 1021
  Hard, 1013
  Hart's Tongue, 1014
  Holly, 1018
  Killarney, 1022
  Lady, 1015
  Maidenhair, 1012
  Male Buckler, 1019
  Marsh Buckler, 1019
  Mountain Bladder, 1017
  Mountain Buckler, 1019
  Oak, 1020
  Ostrich, 1017
  Parsley, 1013
  Royal, 1022
  Shield, 1018
  Shield, Alpine, 1018
  Spleenwort, 1014
  Sweet, 793
Ferns, 1008
  apogamy in, 1010
  apospory in, 1010
  Crested, 1011
  cultivation of, 1011
  Freaks, 1010
  Hybrid, 1010
  Plumose, 1011
  propagation of, 1009
  reproduction of, 1008
  Tasselled, 1011
Ferraria, 936
  ***Pavonia*, 936**
  ***Tigridia*, 936**
Fertilisation, 37
Ferula, 468
Fescue Grass, 960
Festuca, 960
Fetid Gladwin, 928
Feverfew, Common, 536
Ficoideæ, 464
Ficus Carica, 1096
Fig Marigold, 464
Fig, the, 1096
  Brown Turkey, 1097
Figwort, 149
Filbert, 798, 1099

- Filices, 1008
- Filmy Fern, 1021
- Fingers and Toes, 1118
- Fir, Balsam, 1001
  - Common Silver, 1004
  - Douglas, 1000
  - Fragrant, 999
  - Nordmann's, 1004
  - Red, 1001
  - Scots, 995
  - Silver, 1001
  - Spanish Silver, 1004
  - Spruce, 996
  - Weeping, 991
- Fire Bush, 776
- First of May, 421
- Fishbone Thistle, 548
- Fish Guano, 76
- Fitches, 155
- Fitzroya, 975
- *Flacourtia japonica*, 286
- Flag, 917
  - Common, 923
  - Crimson, 948
  - German, 923
  - Sweet, 954
  - Water, 929
  - Yellow, 929
- Flame Flower, 817
  - Nasturtium, 291
- Flax, 284
  - New Zealand, 816
- Fleabane, 505
- Floating Heart, 658
- Florentine Iris, 922
- Floss Flower, 498
- Flower border, arrangement of, 84
  - Garden, 77
    - Calendar for, 1025
- Flower of Love, 256
- Flowering Ash, 640
  - Box, 578
  - Nutmeg, 485
  - Rush, 806
- Flowers, 86
  - double, 86
  - forms of, 88
  - neuter, 88
- Fly Orchis, 892
- Flytrap, Venus's, 444
- Foam Flower, 426
- Fœniculum, 468
- Fog Fruit, 740
- Fontanesia, 641
- Forbidden Fruit, 956
- Forget-me-not, 677
  - Creeping, 672
  - New Zealand, 672
- Forsythia, 687
  - *Fortunei*, 688
  - *Sieboldi*, 688
- Fothergilla, 444
- Foxbane, 168
- Foxglove, 722
- Fragaria, 876
- Francoa, 428
- Francoeæ, 428
- Frankenia, 238
- Frankeniaceæ, 238
- Fraxinella, 296
- Fraxinus, 640
  - *acuminata*, 640
  - *alba*, 640
  - *argentea*, 640
  - *Curtisi*, 640
  - *epiptera*, 640
  - *juglandifolia*, 640
  - *nigra*, 640
  - *pennsylvanica*, 640
  - *rotundifolia*, 640
  - *tomentosa*, 640
- Fremontia, 280
- French Honeysuckle, 845
  - Lavender, 529
  - Marigold, 526
  - Willow, 452
- Fringe Flower, 699
  - Tree, 642
- Fritillaria, 857
  - *macrophylla*, 854
- Fritillary, 857
- Frog-bit, 888
- Fruit borders, 1088
  - development, 89
  - gathering, 1044
  - kinds of, 89
  - kinds cultivated, 1042
  - ripeness of, 1044
  - room, 1089
  - storing, 1089
- Fruit garden, 1028
  - calendar for, 1101
  - site for a, 1029
- Fruit trees, nailing up, 1084
  - planting, 1082
  - in pots, 1040
  - propagation of, 1042
  - pruning, 1081
  - renovating, 1040
  - selection of, 1085
  - training, 1085
- Fuchsia, 455
  - Californian, 452
  - *decussata*, 456
  - *magellanica*, 456
- Fuller's Herb, 249
- Fumaria, 201
  - *eximia*, 198
  - *formosa*, 198
- Fumariaceæ, 198
- Fumitory, 201
- Funkia, 816
- Furze, Common, 830
  - Irish, 830
  - Needle, 828
  - Tam, 830
- *Fusarium Lycopersici*, 1189

G

- GAGEA, 871
- Gaillardia, 527
- Galanthus, 906
- Galax, 600
- Gale, Sweet, 798
- Galega, 837
- Galingale, 971
- *Galinsoga trilobata*, 528
- Galtonia, 881
- Gamopetalæ, 125
- Ganymede's Cup, 906
- Gardener's Garters, 968
- *Gardoquia betonicæfolia*, 758
- *Garidella Nigellastrum*, 155
- Garland Lily, 904
- Garlic, 1151
- Garrya, 476
- Gas Lime, 68
  - Liquor, 72
- Gaultheria, 575
- Gaura, 457
- Gaylussaccia, 571
- Gazania, 546
- Gean, 858
- Gelsemium, 649
- Genista, 828
  - *andreana*, 832
  - *candicans*, 831
  - *cinerea*, 829
  - *juncea*, 830
  - *Retama*, 829
  - *triangularis*, 831
  - *triquetra*, 831
- Gentiana, 652
  - *arvernensis*, 655
  - *barbata*, 655
  - *Catesbæi*, 656
  - *Charpentieri*, 655
  - *gaudiniana*, 656
  - *intermedia*, 655
  - *pseudo-pneumonanthe*, 654
  - *triflora*, 655
- Gentianeæ, 650
- Gentianella, 652
- *Georgina Cervantesi*, 521
- Geraniaceæ, 284
- Geranium, 285
  - *cristatum*, 285
  - *subcaulescens*, 285
- Gerbera, 552
- German Flag, 933
- Germander, 758
- Germination of Seeds, 25
- *Geropogon glabrum*, 554
- Gesneraceæ, 729
- Geum, 374
- Ghent Azaleas, 596
- Giant Fennel, 468
- Gilead, Balm of, 753
- Gillenia, 369
- Ginger Order, 884
- Ginkgo, 987
- Gipsy Tree, 800
- Gladiolus, 947
  - brenchleyensis, 949
  - Childsi, 949
  - Colvillei, 950
  - *crocatus*, 946
  - gandavensis, 950
  - Lemoinei, 951
  - nanceianus, 952
  - nanus, 952
  - *natalensis*, 948
  - *pyramidatus*, 945
  - *ramosus*, 952
- Gladwin, Fetid, 922
- Glaucium, 196
- Glaux, 681
- *Glechoma hederacea*, 751
- Gleditschia, 854
- Globe Amaranth, 764
  - Artichoke, 1141
  - Flower, 151
  - Thistle, 547
- Globularia, 787
- Glory Pea, 840
  - of the Snow, 887
- Glossary, 1
- *Glossocomia clematidea*, 560
- Gloxinia Order, 729
- Glumifloræ, 128
- *Glyceria aquatica*, 968
- *Glycine Apios*, 852
  - *chinensis*, 838
  - *frutescens*, 838
- *Glyptostrobus heterophyllus*, 988
  - *pendulus*, 988
  - *pensilis*, 988
- Gnaphalium, 507
  - *dioicum*, 507
  - *Leontopodium*, 507
- Gnetaceæ, 972
- Goat's Beard, 364, 554
  - Rue, 837
- Goat Thorn, Great, 844
- *Godetia*, 458
  - *grandiflora*, 455
  - *rubicunda*, 458
  - *vinosa*, 455
- Gold Knots, 146
  - Thread, 154
- Golden Ball, 151
  - Bell, 637
  - Chain, 827
  - Club, 955
  - Drop, 681
  - Feather, 586
  - Heath, 509
  - Rain, 827
  - Rod, 496
  - Thistle, 553
- Goldilocks, 502
- Gomphrena, 764
- Good King Henry, 1153

Gooseberry, the, 1092
  Mite, 1094
  Moth, 1094
  varieties to grow, 1094
Goosefoot, 765
  Mercury, 1154
Gordonia, 268
Gorse, 330
Gorteria acaulis, 545
Gourds, 460, 1156
Grafting, 52
  advantages of, 57
  Clay, 56
  double, 57
  time for, 56
Grafts, selecting, 55
Gramineæ, 956
Grammanthes, 437
Grammatocarpus, 459
Grape, American
    Plum, 809
    Summer, 808
  Chicken, 808
  Fox, 809
  Isabella, 809
  Pear, 418
  Vine, 810, 1097
Grape-Flower Vine, 337
Grass, Blue-eyed, 948
  of Parnassus, 428
  Sweet Vernal, 958
Grasses, 956
Greek Valerian, 665
Green Fly, 886
Greenweed, 329
  Dyers, 329
Gregoria vitaliana, 624
Grevillea, 776
Grindelia, 496
Griselinia, 476
Gromwell, 678
Ground Cistus, 584
  Hemlock, 986
  Ivy, 751
  Laurel, 578
  Nut, 851
  Pine, 1024
Groundsel, 540
Growing Point, 27
Growth, 21
Guano, 75
  Fish, 76
Guelder Rose, 480
Guimauve, 272
Gum Cistus, 228
Gum-tree, 447
Gunnera, 446
Gymnocladus, 358
Gymnogramme, 1021
Gymnolomia, 518
Gymnopsis, 518
Gymnosperms, 39, 122
Gymnotheca chinensis, 774
Gymnothrix latifolia, 962
Gynerium, 960
Gypsophila, 248

H

HABERLEA, 781
Hablitzia, 765
Habranthus Andersoni, 909
  pratensis, 911
  speciosus, 911
Hackberry, 787
Hacquetia, 467
Hæmodoraceæ, 889
Hagberry, 861
Hagweed, 469
Hair Grass, 957
Halesia, 684
Halimodendron, 341
Halorageæ, 446
Hamamelideæ, 444
Hamamelis, 445
Haplocarpha, 544
Hard Fern, 1018
Hardy Bamboos, 964
Harebell, 568
  Australian, 558
  Tufted, 558
Hare's Ear, 467
Hare's Tail Grass, 961
Harpalium, 515
Hartoghia capensis, 860
Hart's Tongue Fern, 1014
Hatchet Vetch, 835
Haw, Black, 480
Hawk's Beard, 553
  Yellow, 553
Hawkweed, 553
Hawthorn, 409
  Japanese, 412
  Winter, 805
Hazel, 797
  American, 798
  Constantinople, 798
  Nut, 1099
  Purple, 798
  Witch, 445
Heartsease, 233
Heat and Cold, 25
Heath, 580
  Cornish, 582
  Cross-leaved, 582
  Dorset, 581
  Golden, 509
  Irish, 582
  Prickly, 575
  St. Dabeoc's, 582
Heather, 580
  Irish, 581
  Scotch, 581
Hedera, 471
Hedge Nettle, 755
Hedysarum, 345
Heeling in Broccoli, 1117
Helenium, 526
  grandicephalum striatum, 527
Helenoideæ, 524
Helianthemum, 226
  algarvense, 227
  candidum, 227
  pulverulentum, 227
  surreianum, 227
Helianthoideæ, 511
Helianthus, 515
  argophyllus, 515
  cordatus, 512
  lenticularis, 515
  tuberosus, 1140
Helichrysum, 508
Helicodiceros crinitus, 958
Heliophila, 215
Heliopsis, 512
Heliotrope, 670
  Winter, 539
Heliotropium, 670
  grandiflorum, 671
Helipterum, 508
  Sanfordi, 508
Hellebore, 152
  False, 881
  Manchester, 153
  Oriental, 153
  Scotch, 153
  Stinking, 152
  Sweet-scented, 153
  White, 881
Helleborine, 892
Helleborus, 152
  corsicus, 152
Helmet Flower, 753
Helonias, 878
  asphodeloides, 878
  bracteata, 882
  viridis, 881
Heloniopsis, 878
Hemerocallis, 815
  alba, 817
  cærulea, 817
  cordata, 848
  graminea, 816
  plantaginea, 817
  rutilans, 815
  Sieboldi, 815
Hemimeris coccinea, 706
  urticæfolia, 706
Hemlock, Ground, 986
Hemp Agrimony, 494
  Common, 788
  Tree, 741
Henbane, 687
Hepatica angulosa, 140
  triloba, 141
Heracleum, 469
Herb Christopher, 164
  Robert, 286
  of Grace, 295
  Paris, 880
Herb garden, the, 1160
Herbaceous borders, 80
  planting, 82
  site of, 81
Herbaceous plants, list of, 86
  blue-flowered, 92
  climbers, 89
  for shade, 88
  red-flowered, 91
  white-flowered, 90
  yellow-flowered, 93
Hermodactylus tuberosus, 983
Herniaria, 761
Heron's Bill, 287
Hesperis, 218
  tristis, 208
Hesperocordum hyacinthinum, 828
  Lewisi, 828
Heuchera, 427
Hibiscus, 279
  africanus, 280
Hickory, 790
  Brown, 791
  Shell-bark, 790
  Swamp, 791
  White-heart, 791
Hieracium, 553
Hippeastrum, 910
Hippocrepis, 845
Hippophaë, 781
Hobble Bush, 479
Hoeing, 68
Holbœllia, 179
Holcus, 960
Holly, Common, 299
  Fern, 1018
  Sea, 465
Hollyhock, 272
  Antwerp, 272
Homeria aurantiaca, 948
Honesty, 207
Honey Flower, 317
  Locust, 354
  Wort, 682
Honeysuckle, 482
  Azaleas, 596
  Dutch, 484
  Fly, 484
  French, 345
  Oak-leaved, 484
  Swamp, 595
  Trumpet, 484
Honkenya peploides, 260
Hookera coronaria, 828
Hop, 787
  tree, 297
Hordeum, 961
Horehound, 1162
Horkelia congesta, 878
Horminum, 746
Hornbeam, 797
  American, 797
  Hop, 797
Horse Chestnut, 312
  Mint, 750
  Sugar, 634
Horse-radish, 1162

Horseshoe Geranium, 289
  Vetch, 845
Horsetail, 1023
  Giant, 1023
  Wood, 1024
Hortensia opuloides, 429
Hotbeds, 46
Hoteia japonica, 414
Hottonia, 604
House Leek, 441
  Common, 443
  Hen and Chickens, 443
Houstonia, 487
Houttuynia, 774
Huckleberry, 572
  Squaw, 573
Hudsonia, 227
Humming Bird's Trumpet, 452
Humulus, 787
Humus, 62
Hunnemannia, 197
Huntsman's Cup, 189
Huon Pine, 988
Hutchinsia, 220
Hyacinth, Californian, 827
  Feather, 832
  Grape, 832
  Musk, 833
  Roman, 835
  Spanish, 836
  Star, 839
  Wild, 839
  Wood, 839
Hyacinthus, 833
  candicans, 832
  comosus, 832
  non-scriptus, 839
  patulus, 840
  racemosus, 833
  romanus, 835
  stellaris, 839
Hybridisation, 37
Hybrids, 37
Hydrangea, 429
  Climbing, 431
  nivea, 431
Hydrocharideæ, 863
Hydrocharis, 863
Hydrocleis Commersoni, 806
Hydrophyllaceæ, 666
Hydrophyllum, 667
Hymenanthera, 284
Hymenatherum, 525
Hymenophylleæ, 1021
Hymenophyllum, 1021
Hymenoxys californica, 524
Hyoscyamus niger, 687
  orientalis, 695
  scopolia, 695
Hypecoum, 198
Hypericineæ, 265
Hypericum, 265
Hyssop, 1168
Hyssopus officinalis, 1168

I

IBERIDELLA, 220
Iberis, 218
  Bubani, 218
  jucunda, 217
Ice Plant, 464
Idesia, 286
Ilex, 299
  canadensis, 301
Ilicineæ, 299
Illecebraceæ, 761
Illicium, 173
  anisatum, 174
Immortelle, 508
Impatiens, 294
Incarvillæa, 733
Incas, Lily of the, 91
Incense Tree, 975
Incompletæ, 126
Indian Corn, 964
  Cress, 290, 1168
  Currant, 481
  Mallow, 278
  Pink, 649
  Shot, 885
Indigo, 336
  Bastard, 336
  False, 328
Indigofera, 336
Inflorescence, 38
Inkberry, 300
Intercropping Vegetables, 1105
Inula, 510
Inuloideæ, 507
Ionopsidium, 216
Ipomæa, 683
Ipomopsis elegans, 664
Iresine, 764
Irideæ, 917
Iris, 917
  ægyptia, 931
  amœna, 924
  anglica, 934
  Bearded, 917
  Beardless, 917
  bulbosa persica, 928
  Bulbous, 917
  Crimean, 929
  Cushion, 918
  decora, 927
  English, 934
  Florentine, 922
  fragrans, 920
  fugax, 931
  German, 923
  gigantea, 927
  halophila, 923
  Heldreichi, 932
  hispanica, 935
  imberbis, 925
  Japanese, 925
  juncifolia, 931
Iris—
  Kæmpferi, 925
  lineata, 932
  mauritanica, 925
  microptera, 919
  Mourning, 932
  Netted, 929
  nudicaulis, 920
  Oncocyclus, 918
  Orchid, 927
  pyrenaica, 934
  Regalia, 918
  samaritana, 931
  scorpioides, 919
  Snake's Head, 933
  Spanish, 935
  stenogyne, 923
  stylosa, 933
  subbiflora, 920
  tolmieana, 927
  tomiolopha, 932
  transtagana, 919
  trialata, 919
  vaga, 926
  Wolf's Ear, 926
Irish Furze, 330
  Heath, 582
  Heather, 581
Iron Tree, 444
  Weed, 493
  Wood, 797
Isatis, 221
Isopyrum, 154
Itea, 435
  spinosa, 287
Ivesia unguiculata, 380
Ivy, 471
  Ground, 751
  Irish, 472
  Kenilworth, 708
  Prickly, 808
Ixia, 944
  crocata, 946
Ixiolirion, 918

J

JABOROSA, 691
'Jacks,' 241
Jacob's Ladder, 665
Jacobæa Lily, 910
Jalap Order, 759
Jamesia, 434
Jasione, 557
Jasmine, 686
  Box, 641
  Common White, 687
  Winter, 686
Jasminum, 686
Jeffersonia, 184
Jerusalem Artichoke, 1140
  Sage, 757
  Willow, 780
Jessamine, 636
  Cape, 646
Jew's Mallow, 370
Job's Tears, 818
Jonquil, Campernelle 902
  Queen Anne's, 900, 902
  Rush-leaved, 900
  Sweet-scented, 900
Joss Flower, 905
Joy Weed, 763
Judas Tree, 355
Juglandeæ, 790
Juglans, 791
Juncaceæ, 882
Juncus, 882
  zebrinus, 972
June Berry, 413
Juniper, Carpet, 982
  Common, 980
  Frankincense, 982
  Irish, 981
Juniperus, 980
  bacciformis, 981
  dumosa, 981
  flagelliformis, 980
  Fortunei, 982
  Japonica, 980
  langoldiana, 981
  procumbens, 982
  prostrata, 982
  reevesiana, 980
  repens, 982
  sabinioides, 982
  tamariscifolia, 982
  tetragona, 981
Jupiter's Beard, 384, 443

K

KADSURA, 177
Kaffir Lily, 948
Kainit, 74
Kale, 1116
  Cottager's, 1116
Kalmia, 583
Kangaroo Apple, 688
Kaulfussia amelloides, 498
Kenilworth Ivy, 708
Kerria, 370
Kidney Bean Tree, 338
  Vetch, 384
Killarney Fern, 1022
King's Spear, 823
Kitaibelia, 271
Kitchen Garden, the, 1103
  Calendar for, 1106
Kniphofia, 817
  Tucki, 819
Knitback, 674
Kochia scoparia, 766
Kœlreuteria, 310
Knot Grass, 768
  Weed, 768
Kohl-Rabi, 1118
Korolkowia Sewerowi, 859
Kumquat, 298

L

LABELLING, 47
Labiatæ, 742
Labrador Tea, 584
Laburnum, 827
  Common, 828
  Purple, 827
  ramentaceum, 828
  Scotch, 827
Lackey Moth, 1048
Lacquer Tree, 821
Lactuca, 554
  sativa, 1142
Lady Fern, 1015
Lady's Ear-drops, 455
  Mantle, 381
  Seal, 811
  Slipper, 892
  Smock, 207
Lagurus, 961
Lallemantia canescens, 751
Lamarckia, 961
Lamb's Quarters, 880
  Lettuce, 1161
Lamium, 756
Lantana, 738
Lantern, Chinese, 690
Lapageria, 810
Lapeyrousia, 944
Larch, Chinese, 1005
  False, 1005
  Golden, 1005
Lardizabala, 179
Larix, 1005
  Cedrus, 996
  Deodara, 995
  Kæmpferi, 1005
  pabula, 996
Larkspur, 158
  Rocket, 159
  Scarlet, 159
  Yellow, 290
Lasthenia, 524
Lastrea æmula, 1019
  dilatata, 1019
  Filix-Mas, 1019
  rigida, 1019
  Thelypteris, 1020
Lathyrus, 847
  armitageanus, 848
  Drummondi, 849
  sylvestris platyphyllus, 848
Laurel, Alexandrian, 810
  American, 588
  Bay, 775
  Cherry, 860
  Common, 860
  Great American, 590
  Ground, 578
  Magnolia, 175
  Portugal, 860
  Sheep, 583
  Spanish, 860
  Spurge, 778
Laurel, Victor's, 775
Laureola fragrans, 298
Laurineæ, 774
Laurus, 775
  Sassafras, 775
Laurustinus, 480
Lavandula, 748
Lavatera, 274
Lavender, 743
  Cotton, 529
  French, 529
  Sea, 601
Lawns, 118
  manuring, 116
  mossy, 116
  plants for, 117
  renovating old, 117
  weeding, 116
Layering, 95
  principle of, 60
Layia, 528
Lead Plant, 336
  Wort, 604
Leaf-mould, 62
Leather Flower, 186
  Jackets, 1129
  Wood, 779
Leavenworthia, 207
Leaves, 82
  arrangement of, 85
  cuttings of, 52
  evaporation from, 84
  functions of, 84
  structure of, 83
Lecanium persicæ, 1081
Ledum, 584
Leek, 1150
Leguminosæ, 822
Leguminous Crops, 1123
Leiophyllum, 584
Lemon-scented Verbena, 739
Lent Lily, 903
Lenten Rose, 158
Lentibularieæ, 728
Leonotis, 756
Leontice, 182
  altaica, 182
Leontopodium, 507
Leopard Lily, 853
Leopard's Bane, 540
Lepachys columnaris, 514
  pinnatifida, 515
Lepidium sativum, 1161
Lepidostemon pentstemonoides, 715
Leptandra virginica, 727
Leptosiphon densiflorus, 664
  parviflorus rosaceus, 664
  roseus, 665
Leptospermum, 447
Leptosyne, 519
Lespedeza, 846
Lesser Celandine, 148
Lettuce, 1142
  Lamb's, 1161
  Thistle, 554
Leucanthemum lacustre, 584
Leucojum, 907
Leucothoë, 577
  floribunda, 579
  Lobbi, 577
Lever-wood, 797
Lewisia, 263
Leycesteria, 485
Liatris, 495
  propinqua, 495
Libertia, 942
Libocedrus, 975
Light, influence of, 40
Ligularia japonica, 542
  macrophylla, 542
  sibirica, 543
Liguliflоreæ, 552
Ligustrina amurensis, 638
  pekinensis, 639
Ligustrum, 642
  amurense, 643
  angustifolium, 643
  californianum, 643
  glabrum, 643
  Kellermanni, 643
  magnoliæfolium, 643
  myrtifolium, 643
  nepalense, 644
  rosmarinifolium, 648
  Sieboldi, 643
  spicatum, 643
  strictum, 643
  syringæflorum, 643
  villosum, 644
Lilac, 638
  Common, 639
  Persian, 639
Liliaceæ, 808
Liliaceous Crops, 1145
Lilium, 842
  autumnale, 856
  Belladonna, 851
  Biondi, 856
  bloomerianum, 850
  chinense, 856
  Dalhansoni, 852
  Elisabethæ, 851
  excelsum, 856
  Isabellinum, 856
  linifolium, 856
  loddigesianum, 858
  lucidum, 846
  michauxianum, 856
  nigrum, 858
  nitidum, 854
  odorum, 850
  pumilum, 856
  sinicum, 847
  thomsonianum, 854
  Uke-uri, 844
Lily, African, 826
  Atamasco, 909
  Belladonna, 912
  Black, 858
  Chinese Sacred, 905
  Garland, 904
  Jacobæa, 910
  Japanese Toad, 879
  Lent, 903
  Leopard, 853
  Madonna, 846
  Mariposa, 872
  Mount Etna, 908
  New Zealand Water, 149
  of the Field, 908
  of the Incas, 915
  of the Valley, 813
  Orange, 848
  Rockwood, 149
  Saffron, 848
  St. Bernard's, 826
  St. Bruno's, 823
  Swamp, 856, 910
  Tiger, 857
  Turk's Cap, 852
Lily-tree, 174
Lime, gas, 68
  superphosphate of, 72
Lime-tree, 282
  Ogeechee, 476
  White or Silver, 281
Liming the soil, 67, 1030
Limnanthes, 292
Limnanthemum, 658
Limnocharis, 806
Limodorum tuberosum, 891
Linaria, 707
  crassifolia, 709
  elegans, 708
Lindelofia, 672
Linden, 280
Lindleya, 371
Lineæ, 282
Ling, Common, 580
Linnæa, 482
Linosyris vulgaris, 502
Linum, 282
  Chamissonis, 284
Lion's Ear, 756
  Foot, 507
  Leaf, 182
Lippia, 739
Liquidambar, 445
Liriodendron, 176
Liriope, 889
Listera ovata, 892
Lithospermum, 678
  fruticosum, 679
  petræum, 679
  rosmarinifolium, 679
Lizard's Tail, 774
Lloydia, 872
  aurantiaca, 458
  palmata, 459

Lloydia—
  Placei, 458
  tricolor, 458
  Wallisi, 459
Loasa, 458
Loaseæ, 457
Lobelia, 556
  littoralis, 555
Lobelieæ, 555
Loblolly Bay, 268
Locust Tree, 338, 354
  Clammy, 339
Lodewort, 147
Lodoicea sechellarum, 956
Logan Berry, 1087
Loganiaceæ, 648
Loiseleuria, 582
Lomaria, 1018
London Pride, 426
Lonicera, 482
  balearica, 484
  brachypoda, 483
  bracteata, 483
  chinensis, 484
  diversifolia, 484
  floribunda, 484
  Fraseri, 483
  halleana, 483
  webbiana, 482
Loosestrife, 628
  Purple, 451
  Yellow, 630
Lopezia, 457
Loquat, 412
Loranthaceæ, 781
Lords and Ladies, 953
Loropetalum, 445
Lotus, 335
  Dorycnium, 335
  rectus, 335
Love-in-a-Mist, 155
Love - lies - bleeding, 763
Love-tree, 355
Lubinia atropurpurea, 629
Lucern, 333
Lunaria, 207
Lungwort, 675
Lupine, 324
  Bastard, 334
  Tree, 324
Lupinus, 324
  albifrons, 324
  arbustus, 325
  bimaculatus, 326
  Dunnetti, 326
  grandifolius, 326
  hirsutus, 326
  macrophyllus, 326
  nootkatensis fruticosus, 325
  odoratus, 325
  plumosus, 325
  semiverticillatus, 326
  subramosus, 326
  sulphureus, 325
  texensis, 326
Luzuriaga, 810
Lychnis, 255
  alba, 257
  diurna, 256
Lycium, 691
Lycopodiaceæ, 1024
Lycopodium, 1024
Lycoris, 912
Lyme Grass, 959
Lyonia, 578
Lyre Flower, 198
Lysichitum, 955
Lysimachia, 628
  capitata, 630
  verticillata, 630
Lythrarieæ, 449
Lythrum, 450

M

MAACKIA amurensis, 352
Macleaya yedoënsis, 195
Macrotomia, 680
Madagascar Periwinkle, 645
Madaria elegans, 523
Madia, 523
Madonna Lily, 846
Madwort, 213
Magnolia, 174
  auriculata, 175
  frondosa, 176
  halleana, 176
  precia, 174
  soulangeana, 175
  thompsoniana, 175
  Thurberi, 175
  tripetala, 176
  Yulan, 174
Magnoliaceæ, 173
Magpie Moth, 1094
Mahonia, 180
Maianthemum, 818
Maidenhair Fern, 1012
  Meadow Rue, 139
  Tree, 987
Maiden's Wreath, 428
Maize, 964
Malachodendron ovatum, 268
Malcolmia, 214
Male Fern, 1019
Mallow, 275
  Indian, 278
  Jew's, 370
  Marsh, 272
  Musk, 275
  Poppy, 276
  Tree, 274
  White Jew's, 370
Malope, 271
Malus halleana, 406
  Parkmanni, 406
Malva, 275
  campanulata, 276
  involucrata, 276
  lateritia, 277
Malvaceæ, 270
Malvastrum, 277
Mamestra brassicæ, 1118
Mamillaria, 464
Mammoth Tree, 984
Mandrake, American, 185
Manulea fastigiata, 719
  multiflora, 719
Manures, 69
  bone, 73
  farmyard, 74
  for fruit trees, 1080
  guano, 75
  nitrogenous, 70
  phosphatic, 72
  potash, 73
  poultry, 75
  seaweed, 76
Maple, 813
  Ash-leaved, 815
  Bird's-eye, 817
  Common, 813
  Norway, 816
  Scarlet, 817
  Sugar, 817
Marguerite, 582
  Carnations, 241
Margyricarpus, 381
Marigold, African, 526
  Cape, 548
  Common, 544, 1168
  Corn, 585
  Fig, 464
  French, 526
  Marsh, 150
  Striped Mexican, 526
Mariposa Lily, 872
Marjoram, 744, 1168
  Knotted, 1168
  Pot, 1168
  Sweet, 1168
Marrow, Vegetable, 1155
Marrubium, 1162
Marsh Elder, 480
  Fern, 1019
  Mallow, 272
  Marigold, 150
  Trefoil, 658
Martynia, 785
Marvel of Peru, 760
Mask Flower, 705
Masterwort, 466
Mastich Tree, 321
Matricaria, 587
Matthiola, 201
May, 409
  Apple, 185
  First of, 421
Mayflower, 578
Maytenus, 308
Mazus, 721
Meadow Beauty, 449
  Grass, 963
  Rue, 137
    Fetid, 138
Meadow Rue, Maidenhair, 139
  Saffron, 875
  Saxifrage, 421
  Sweet, 368
Meconopsis, 198
Medicago, 333
Medick, 333
Medlar, 406, 1085
  Japanese, 412
Medullary rays, 30
Megasea cordifolia, 419
  crassifolia, 419
  purpurascens, 425
Meisteria cernua, 580
Melastomaceæ, 449
Melianthus, 317
Melica, 961
Melissa, 746
Melittis, 754
Melon, the, 1158
Menispermaceæ, 178
Menispermum, 178
Mentha, 744, 1164
Mentzelia, 458
Menyanthes, 657
Menziesia, 597
  empetriformis, 582
  polifolia, 582
Merendera, 877
Mertensia, 676
Mesembryanthemum, 464
Mespilus Amelanchier, 418
  Cotoneaster, 410
  germanica, 406
  grandiflora, 406
Meum, 468
Mexican Marigold, 526
Mezereon, 778
Michaelmas Daisy, 500
Michauxia, 560
Micromeria, 745
Micropyle, 6
Microsperma bartonioides, 458
Mignonette, 222
Mildew, 885
  on Fruit, 1048
  on Parsley, 1132
  on Peaches, 1080
  on Roses, 885
Milfoil, 528
Milk Thistle, Our Lady's, 549
  Vetch, 342
Milkseed, 287
Milkwort, 287
  Sea, 631
Milla, 827
  capitata, 828
  grandiflora, 828
  laxa, 829
  Leichtlini, 829
  peduncularis, 829
  uniflora, 830
Millettia japonica, 338

Mimulus, 719
  guttatus, 720
  punctatus, 720
  roseus, 720
Mina lobata, 684
Mint, 744, 1162
  Cat, 750
  Horse, 750
Mirabelle Plum, 859
Mirabilis, 760
Miscanthus, 962
Mistletoe, 781, 1049
Mitchella, 488
Mitella, 426
Mitraria, 729
Mitre Flower, 729
Mitrewort, False, 426
Moccasin Flower, 898
Mock Orange, 482
  Plane Tree, 817
  Privet, 641
Mocker Nut, 791
Modiola geranioides, 277
Mohammed's Flower, 679
Molopospermum, 467
Moltkia, 679
  graminifolia, 679
Molucella, 756
Monarda, 750
Moneses grandiflora, 598
Moneywort, 629, 721
Monkey Flower, 719
Monkshood, 162
Monk's Pepper Tree, 741
Monochlamydeæ, 126, 759
Monocotyledons, 81, 127
Monopetalæ, 125
Montanoa, 518
Montbretia aureo-Pottsi, 946
  Pottsi, 946
Moonwort, 625, 1028
  Blue, 625
Moorwort, 579
Moosewood, 479
Morina, 490
Morisia, 222
Morning Glory, 688
Morphixia, 944
Morus, 789
Moth, Goat, 1052
  Heart and Dart, 1120
  Leopard, 1052
  Magpie, 1094
  Small Ermine, 1048
  Winter, 1052
Mother-of-thousands, 708
Mound Lily, 898
Mountain Ash, 405
    American, 405
  Avens, 874
  Tobacco, 540
Mountain Vine, 288
Mournful Widow, 491
Muehlenbeckia, 771
Mugwort, 588
Mulberry, Common, 789, 1100
  Paper, 788
  White, 789
Mulching, 69
Mulgedium, 554
Mullein, 701
Musa, 888
Muscadine, 810
Muscari, 882
Mushroom, 1166
  Spawn, 1169
Musk, 720
  Mallow, 275
Mustard, 1164
Mutisia, 551
Mutisiaceæ, 551
Mycelium, 1169
Myginda myrtifolia, 802
Myosotidium, 672
Myosotis, 677
  cintra, 678
  rupicola, 677
Myrica, 798
Myricaceæ, 792
Myricaria, 264
Myrobalan, 858
Myrrh, 467
Myrrhis, 467
Myrtaceæ, 447
Myrtle, 448
  Bog, 798
  Candleberry, 798
  Sand, 584
Myrtus, 448

N

NAIADACEÆ, 805
Nailing fruit trees, 1034
Nailwort, 761
Nandina, 188
Narcissus, 898
  Bunch, 905
  candidissimus, 902
  Gardenia, 908
  hispanicus, 901
  Mogador, 897
  montanus, 908
  Paper White, 905
  Pheasant's Eye, 908
  Poet's, 908
  Polyanthus, 905
  Scilly White, 905
Nardosmia fragrans, 589
Narthecium, 877
Nasturtium, 1166
  Flame, 291
  Golden, 290
Naumburgia thyrsiflora, 680
Navelwort, 487
Navelwort, Venus's, 671
Nectarine, the, 1078
  varieties to grow, 1082
Needle Furze, 828
Negundo aceroides, 815
  cissifolium, 818
  fraxinifolium, 815
  nikoense, 815
Neillia, 868
Nemesia, 706
Nemophila, 667
  atomaria, 667
Nepalese Laburnum, 822
Nepeta, 750
Nephrodium, 1019
  montanum, 1019
Nertera, 488
Nettle Tree, 787
Neviusia, 870
New Jersey Tea, 805
New Zealand Flax, 816
  Blue Bell, 558
Nicotiana, 695
  angustifolia, 696
  colossea, 697
  gigantea, 696
  havanensis, 697
  latissima, 696
  undulata, 697
Nierembergia, 698
  phœnicea, 697
Nigella, 155
'Niggers,' 1120
Nightshade, 687
  Deadly, 687
Nine Bark, 868
Nitrate of Soda, 71
Nitrogen, 70
  Uses of, 71
Nolana, 686
Nothoscordum, 880
  aureum, 880
Notospartium, 840
Nuphar, 185
Nut, Barbary, 931
  Barcelona, 798
  Bitter, 791
  Hazel, 1099
  Hickory, 790
  Mocker, 791
  Pecan, 791
  Spanish, 931
Nutmeg, Californian, 982
  Flowering, 485
Nuttallia, 868
  digitata, 276
  Papaver, 276
Nux vomica, 649
Nyctagineæ, 759
Nycterinia lychnidea, 718
Nymphæa, 186
  advena, 185
  kalmiana, 186
Nymphæa—
  semiaptera, 187
Nymphæaceæ, 185
Nyssa, 476
  multiflora, 477

O

OAK, 798
  Bitter, 799
  Black, 800
  Champion, 800
  Cork, 800
  Enceno, 799
  Fern, 1020
  Holly, 800
  Holm, 800
  Hungarian, 800
  Kermes, 799
  Live, 799
  Moss-cupped, 799
  Red, 800
  Scarlet, 799
  Turkey, 799
  Vallonea, 779
Obeliscaria pulcherrima, 514
Ocimum, 1160
Ocotea californica, 775
Œnothera, 458
  Lindleyi, 458
  marginata, 454
Offsets, 81
Ogeechee Lime, 476
Oidium Tuckeri, 1099
Old Maid, 645
Old Man's Beard, 186, 425
Olea fragrans, 642
Oleaceæ, 636
Olearia, 504
Oleaster, 779
Olive, Wild, 779
Omphalodes, 671
Onagrarieæ, 451
Onion, 1148
  Bulb-bearing, 1149
  Egyptian, 1149
  maggot, 1132
  Perennial, 1149
  Potato, 1149
  Top, 1149
  Tree, 1149
  Welsh, 1150
Onobrychis, 846
Onoclea, 1017
Ononis, 832
Onopordon, 548
Onosma, 681
Onychium, 1018
Oosphere, 1009
Oospore, 1009
Ophelia alata, 657
  angustifolia, 657
  corymbosa, 657
  paniculata, 657
Ophioglosseæ, 1022
Ophioglossum, 1022

Ophiopogon, 889
  spicatus, 889
Ophrys apifera, 892
  aranifera, 892
  muscifera, 892
Opium, Poppy, 192
Orache, 1158
Orage, 1158
Orange, 296
  Ball-tree, 649
  Flower, Mexican, 296
  Lily, 848
Orchideæ, 890
Orchids, Poor Man's, 917
Orchis, 891
  Bee, 892
  Fen, 892
  Fly, 892
  Green-winged, 892
  Marsh, 891
  Spider, 892
  Spotted, 891
Oreodaphne californica, 775
Origanum, 744, 1168
Orixa japonica, 808
Ornithogalum, 842
  divaricatum, 828
  ixioides, 829
  luteum, 872
Ornus europæa, 640
Orobus, 850
Orontium, 955
Orpine, 438
Osier, 808
  Golden, 802
  Purple, 808
Osmanthus, 641
Osmosis, 23
Osmunda, 1022
Osmundeæ, 1022
Osoberry, 368
Osteomeles, 418
Ostrowyskya, 559
Ostrya, 797
Oswego Tea, 750
Othonna cheirifolia, 548
Othonnopsis, 548
Ourisia, 723
Our Lady's Milk Thistle, 549
Ovary, 24
Ovule, 24
Oxalis, 292
  Deppei, 294
  rosea, 298
Ox Eye, 145
  Daisy, 584
    Great, 585
Oxlip, 608
Oxycoccus, 578
Oxydendron, 577
Oxytropis, 844
Oxyura chrysanthemoides, 523
Oyster Plant, 676
  Spanish, 558
Ozothamnus, 507

P

PACHYSTIMA, 802
Paddock Pipes, 1023
Pæderota, 724
Pæonia, 165
  edulis, 165
  Fischeri, 165
  intermedia, 165
  laciniata, 167
  lobata, 167
  lutea, 171
  Mas, 166
  Moutan, 171
  Russi, 166
  sessiliflora, 168
  sibirica, 165
Pæony, Chinese, 168
  Tree, 171
Pagoda Tree, 352
Paigle, 618
Palafoxia, 525
Palava, 271
Paliurus, 808
Palm, 802
  Lily, 820
Palma-Christi, 784
Palmeæ, 955
Palmers, Black, 1120
Pampas Grass, 960
Pancratium, 918
Panick Grass, 962
Panicum, 962
Pansy, 288
Papaver, 190
  Musselli, 193
Papaveraceæ, 189
Paper Mulberry, 788
Papilionaceæ, 822
Paradisea, 823
Paradise Stock, 1045
Parasol Pine, 989
Parchment Bark, 236
Parenchyma, 33
Paris, 880
  Green, 1126
Parnassia, 428
Parochetus, 838
Paronychia, 761
Parrot Beak, 840
  Bill, 840
Parrotia, 444
Parrya, 203
Parsley, 1132
  Fern, 1018
  Turnip-rooted, 1133
Parsnip, the, 1129
  Cow, 469
Pasithea, 826
Pasque-flower, 148
Passiflora, 460
Passifloreæ, 459
Passion Flower, 460
Paulownia, 712
Pavia discolor, 811
  hybrida, 811
  macrostachya, 812
  rubra, 812
Pea, the, 1123
  Everlasting, 848
  Lord Anson's, 848
  Shamrock, 838
  Sweet, 848
  Tangier, 850
  Tree, Siberian, 341
Peach, the, 862, 1078
  borders, 1079
  diseases of the, 1080
  varieties to grow, 1081
Pear, the, 1059
  Grape, 418
  Sandy, 407
  Snow, 407
  varieties to grow, 1068
  wild, 406
Pearl Bush, 369
  Everlasting, 507
  Weed, 260
  Wort, 260
Pecan Nut, 791
Pectis, 526
Pedalineæ, 784
Pedlar's Basket, 425
Pegging down Roses, 384
Pelargonium, 288
  hederæfolium, 288
  lateripes, 288
  scutatum, 288
Peltandra, 954
Peltaria, 221
Pennisetum, 962
Pennyroyal, 1164
Pentstemon, 712
  angustifolius, 714
  atropurpureus, 714
  cyananthus, 714
  elegans, 714
  erianthera, 714
  gentianoides, 715
  Gordoni, 714
  hirsutus, 716
  mackayanus, 716
  pulchellus, 714
  roseus, 714
Pepperidge, 477
Peppermint, 1164
Perilla, 744
Periploca, 647
Perisperm, 25
Periwinkle, 645
  Madagascar, 645
Pernettya, 575
Persian Ranunculus, 147
Persica davidiana, 859
  vulgaris, 862
Persimmon, 682
Peruvian Lily, 914
Petaloideæ, 127
Petalostemon, 886
Petasites, 589
Peter's Pence, 207
Petrocallis pyrenaica, 212
Petrocoptis pyrenaica, 257
Petteria, 828
Petty Whin, 828
Petunia, 697
  intermedia, 700
Peucedanum sativum, 1129
Phacelia, 668
Phalangium Liliago, 826
  pomeridianum, 828
Phalaris, 963
Phanerogams, 121
Pharbitis hederacea, 683
  hispida, 683
Phaseolus multiflorus, 1127
  vulgaris, 1126
Pheasant's Eye, 144 246
Philadelphus, 432
  japonicus, 433
  speciosus, 433
Philageria, 810
Philesia, 810
Phillyrea, 641
Phlomis, 757
  laciniata, 758
  Leonurus, 756
Phlox, 658
  canadensis, 660
  cordata, 661
  corymbosa, 661
  crassifolia, 661
  decussata, 663
  Garden, 662
  latifolia, 661
  longiflora, 661
  penduliflora, 661
  pilosa amœna, 660
  scabra, 661
  stolonifera, 661
  triflora, 661
  undulata, 661
  verna, 661
Phœnix dactylifera, 956
Phormium, 816
Phosphatic manures 72
Photinia, 411
  arguta, 412
Phragmidium mucronatum, 886
Phragmitis communis, 958
Phygelius, 711
Phyllostachys, 969
  Kumasaça, 970
Phylloxera vastatrix, 1099
Physalis, 690
Physochlaina, 695
Physostegia, 754
Phyteuma, 561
  scorzoneræfolium, 562

Phytolacca, 766
Phytolaccaceæ, 766
Phytophthora infestans, 1186
Phytoptus ribis, 1096
Picea, 996
  Abies, 1004
  balsamea, 1001
  bicolor, 997
  bracteata, 1002
  canadensis, 999
  cephalonica, 1002
  concolor, 1002
  Douglasi, 1000
  Fraseri, 1002
  grandis, 1001, 1003
  lowiana, 1003
  magnifica, 1003
  nobilis, 1003
  nordmanniana, 1004
  pectinata, 1004
  Pichta, 1005
  Pindrow, 1005
  Pinsapo, 1004
  religiosa, 1004
  rubra, 998
  smithiana, 997
  Veitchi, 1005
  vulgaris, 997
  webbiana, 1005
Pickerel Weed, 882
Picotee, 240
Pieris, 579
  brassicæ, 1113
  rapæ, 1113
Pigeon Berry, 767
Pigmy Sunflower, 528
Pignut, 791
Pilewort, 149
Pilot Weed, 511
Pimpernel, 681
  Bog, 682
  Yellow, 629
Pincushion Flower, 491
Pine, 990
  Austrian, 992
  Barren Beauty, 599
  Bhotan, 991
  Black, 992
  Calabrian, 994
  Chili, 989
  Cluster, 993
  Corsican, 992
  Huon, 988
  Jerusalem, 991
  Knee, 992
  Lacebark, 990
  Lord Aberdeen's, 993
  Maritime, 993
  Monterey, 991
  Nut, 994
  Parasol, 989, 994
  Scotch, 995
  Scrub, 990
  Stone, 994
  Strawberry, 876
  Sugar, 992
Pine—
  Swiss Stone, 990
  Umbrella, 989
  Weymouth, 994
  White-bark, 990
Pinguicula, 728
Pink, 246
  Amoor, 244
  Bush, 246
  Chinese, 243
  Cushion, 251
  Fire, 254
  Fringed, 247
  Glacier, 245
  Ground, 662
  Maiden, 244
  Montpelier, 245
  Moss, 662
  Rock, 245
  Root, 649
  Sweet, 247
Pinus, 990
  Abies, 997
  balsamea, 1001
  Beardsleyi, 994
  benthamiana, 994
  Bolanderi, 991
  Boursieri, 991
  brachyptera, 994
  bracteata, 1002
  brunoniana, 999
  Brutia, 994
  californica, 991
  canadensis, 999
  carica, 994
  carpatica, 992
  cedrus, 996
  commutata, 997
  concolor, 1002
  deflexa, 992
  Deodara, 995
  devoniana, 993
  Douglasi, 1000
  dumosa, 999
  edgariana, 993
  excelsa, 997
  excorticata, 990
  firma, 1002
  Fraseri, 1002
  grandis, 1001, 1003
  hudsonica, 990
  Kæmpferi, 1005
  Khutrow, 997
  lanceolata, 988
  Larix, 1005
  macrocarpa, 991
  maderensis, 994
  maritima, 993
  Menziesi, 998
  Mugho, 992
  nigra, 998
  nitida, 993
  nobilis, 1003
  Nuttalli, 1006
  occidentalis, 993
  oocarpoides, 993
  orientalis, 998
  paroliniana, 994
  parryana, 994
  pattoniana, 1000
Pinus—
  Pindrow, 1005
  Pumilio, 992
  radiata, 991
  rubra, 998
  selenolepis, 1005
  sinclairiana, 994
  sitchensis, 998
  Skinneri, 993
  strobiliformis, 990
  taxifolia, 1000
  tuberculata, 991
  uncinata, 992
  venusta, 1002
Pipe Tree, 688
Piperaceæ, 773
Piptanthus, 822
Pistachio Nut, 821
Pistacia, 821
Pisum sativum, 1123
Pitch-tree, Burgundy, 997
Pittosporeæ, 236
Pittosporum, 236
  chinense, 236
Plagianthus, 277
Plane, American, 789
  Common, 790
  London, 790
  Mock, 817
Planera acuminata, 787
  crenata, 787
Plant-cells, 22
  foods, 69
Plantain Lily, 816
  Water, 805
Plants, classification of, 120
  life history of, 21
  natural orders of, 121
Plasmodiophora Brassicæ, 1118
Platanaceæ, 789
Platanus, 789
Platycodon, 559
Platycrater, 438
Platystemon, 190
Platystylis cyaneus, 850
Pleurisy-root, 648
Plum, the, 1069
  American wild, 857
  Chickasaw, 858
  Common, 859
  diseases of the, 1071
  Fir, 988
  gumming, 1071
  Mirabelle, 859
  Sand, 863
  Tortrix, 107
  varieties to grow, 1071
  weevil, 1071
Plumbagineæ, 600
Plumbago, 604
Plumule, 11
Pneumonanthe Kurroo, 654
Poa, 963
Podalyria lupinoides, 823
Podocarpeæ, 988
Podocarpus *andina*, 988
  coriacea, 985, 987
  koraiana, 985
Podolepis, 509
  chrysantha, 509
Podophyllum, 185
Poison Dogwood, 321
  Elder, 321
  Ivy, 320
  Oak, 320
  Sumach, 321
Poke Weed, 766
Polar Plant, 511
Polemoniaceæ, 658
Polemonium, 665
  pulcherrimum, 666
  Richardsoni, 666
  villosum, 666
Polianthes, 915
Polyanthus, 620
Polygala, 237
Polygaleæ, 237
Polygonaceæ, 767
Polygonatum, 811
Polygonum, 768
  adpressum, 772
  Brunonis, 768
  Sieboldi, 769
Polymnia grandis, 51
Polypetalæ, 122
Polypodiaceæ, 1012
Polypodium, 1020
Polypody, Common, 1021
  " Limestone, 1020
Polypteris hookeriana, 525
  texana, 525
Polystichum aculeatum, 1018
  angulare, 1018
  Lonchitis, 1018
Pomeæ, 405
Pomegranate, 451
Pondweed, Cape, 805
Pontederia, 882
Pontederiaceæ, 882
Poor Man's Orchids, 917
Poplar, 803
  Balm of Gilead, 804
  Balsam, 804
  Black, 804
  Carolina, 804
  Grey, 803
  Lombardy, 804
  Necklace, 804
  Ontario, 804
  Tacamahac, 804
  White, 803
Poppy Anemone, 140
  Bristly, 192
  Californian, 190, 197
  Carnation, 192

Poppy—
  Celandine, 195
  Corn, 192
  Cyclamen, 195
  Danebrog, 192
  French, 192
  German, 192
  Horned, 196
  Iceland, 191
  Mallow, 276
  Opium, 192
  Oriental, 191
  Pæony-flowered, 192
  Picotee, 192
  Plume, 195
  Prickly, 193
  Ranunculus, 192
  Shirley, 192
  Tree, 196
  Tulip, 191
  Welsh, 194
  White Bush, 190
Populus, 803
  canadensis, 804
  græca, 804
  monilifera, 804
  nivea, 803
Port Orford Cedar, 978
Portugal Cabbage, 1115
  Laurel, 360
  Quince, 408
Portulaca, 261
Portulaceæ, 261
Potash manures, 73
Potato, the, 1133
  disease, 1136
  from seed, 1134
  manures for, 1135
  spraying, 1136
  Tree, 688
Potentilla, 376
  Bocconi, 377
  formosa, 379
  insignis, 378
  minima, 379
  pedata, 379
  pedemontana, 378
Potentilleæ, 373
Poterieæ, 381
Pourthiæa, 412
Prairie Clover, 336
  Dock, 511
Pratia, 555
Pretty Betsy, 490
Pretty Face, 829
Prickly Ash, 296
  Comfrey, 678
  Heath, 575
  Rhubarb, 446
Prickwood, 474
Pride of California, 349
  Rochester, 481
Primrose, 604
  Bird's-eye, 608
  Common, 617
  Fairy, 611
  Japanese, 610
Primula, 604
  acaulis, 617
Primula—
  ænensis, 607
  amœna, 615
  candolleana, 610
  cashmiriana, 607
  Churchilli, 605
  Freyeri, 607
  humilis, 614
  jellenkiana, 607
  longifolia, 606
  lutea, 606
  macrophylla, 606
  minima hybrida, 609
  minima pubescens, 616
  Munroi, 610
  poculiformis, 612
  pusilla, 612
  veris, 613
  villosa, 617
Primulaceæ, 604
Primulina, 729
Prince's Feather, 768
Prinos glaber, 800
Privet, 642
  Common, 644
  Golden, 643
  Mock, 641
Propagation, 41
  by budding, 58
  by cuttings, 48
  by division, 60, 100
  by grafting, 52
  by layering, 59
  by seeds, 24, 42
  by suckers, 60
Prophet Flower, 679
Proteaceæ, 776
Prothallium, 1009
Prothallus, 1009
Protoplasm, 22
Prumnopitys, 988
Pruneæ, 856
Prunella, 754
Pruning—
  Fruit trees, 1081
  How to prune, 1083
  Ornamental trees, 105
  Roots, 1081
  Roses, 384
  Summer, 1084
  When to prune, 1084
Prunopsis Lindleyi, 863
Prunus, 856
  baldschuanica, 860
  Bungei, 860
  cornuta, 861
  domestica, 859
  insititia, 859
  mirobalana, 859
  nigra, 857
  paniculata, 862
  pattoniana, 861
  Pissardi, 858
  pruneauliana, 859
  sinensis, 860
  spinosa, 859
Pseudægle sepiaria, 298
Pseudolarix, 1005
Pseudotsuga, 1000
  taxifolia, 1000
Psoralea, 335
Ptelea, 297
Pteris, 1013
Pterocarya, 792
Pterostyrax corymbosum, 684
  hispidum, 684
Puccoon, Red, 195
Pulmonaria, 675
  dahurica, 676
  maritima, 676
  paniculata, 676
  sibirica, 676
  virginica, 676
Pulsatilla alpina, 140
  Halleri, 141
  pratensis, 143
  vernalis, 144
  vulgaris, 143
Punica, 451
Purple Loosestrife, 451
  Scabious, 491
Purshia, 373
Purslane, 261
  Rock, 261
Puschkinia, 837
Pyracanth, 409
Pyrethrum, 585
  frutescens, 582
  uliginosum, 585
Pyrola, 598
Pyrus, 405
  Botryapium, 413
  cratægifolia, 407
  fennica, 407
  floribunda, 405
  lanata, 407
  nepalensis, 407
Pyxidanthera, 599

Q

QUAKING GRASS, 959
Quamash, 841
Queen of the Meadows, 865
Queen of the Prairie, 864
Queen Stock, 208
Quercus, 798
  Buergeri, 799
  Gramuntia, 800
  pannonica, 800
  Ungeri, 799
Quick, 408
Quillajeæ, 871
Quince, 407, 1085
  Apple-shaped, 1085
  False, 406
  Japanese, 406, 412
  Pear-shaped, 1085
  Portugal, 408, 1085

R

RABBIT BERRY, 781
Radish, the, 1120
  Java, or Rat's Tail, 1121
Ragged Robin, 256
Ragweed, 540
Ramondia, 730
Rampion, 567
  Horned, 561
Ram's Foot, 147
Ranunculaceæ, 131
Ranunculus, 146
  Persian, 147
  Turban, 147
  Turkey, 147
Raphanus caudatus, 1121
  Raphanistrum, 1120
  sativus, 1120
Raspberry, the, 1085
  Black, 373, 1089
  varieties to grow, 1087
  Virginian, 373
Reaumuria, 265
Red Bryony, 461
  Buckeye, 312
  Campion, 256
  Hot Poker, 817
  Ink Plant, 767
  Morocco, 145
  Puccoon, 195
  Spider, 1157
  Valerian, 490
  Wood, Californian, 984
Reed, 958
Reedmace, 953
Rehmannia, 721
Reineckia, 814
Reseda, 222
Resedaceæ, 222
Respiration, 34
Rest Harrow, 332
Retinospora ericoides, 980
  leptoclada, 980
  obtusa, 979
  pisifera, 979
Rhamneæ, 303
Rhamnus, 304
  oleifolius, 304
  scandens, 304
  utilis, 304
  volubilis, 304
Rhaphiolepis, 412
Rhazya, 645
Rheum, 770, 1154
Rhexia, 449
Rhinopetalum Karelini, 858
Rhodanthe Manglesi, 508
Rhodiola rosea, 440

Rhodocistus bertholetianus, 224
Rhododendron, 585
  argenteum, 589
  Chamæcistus, 584
  Cunningham's White, 587
  flavum, 594
  Gibsoni, 589
  Hybrids, 592
  minus, 591
  rhombicum, 595
Rhodora canadensis, 591
Rhodothamnus, 584
Rhodotypos, 870
Rhubarb, 770, 1154
  False, 188
Rhus, 819
  caroliniana, 820
  coccinea, 820
  elegans, 820
  sanguinea, 820
  suaveolens, 819
  vernix, 821
Rhynchites cupreus, 1071
Rhynchospermum jasminoides, 646
Ribbon Grass, 968
Ribes, 486
  Beatoni, 486
  floridum, 486
  inebrians, 486
  Loudoni, 486
  missouriense, 486
Ricepaper Plant, 471
Richardia, 955
  æthiopica, 955
Ricinus, 784
Ridge Cucumber, 1158
Ridging-up, 65
Roast Beef Plant, 922
Robinia, 838
  ambigua, 838
  bella-rosea, 839
  echinata, 838
  glutinosa, 839
  Halodendron, 841
  jubata, 842
Rock Broom, 828
Rockery, facing, 97
  sunk, 98
Rocket, 218
  Cress, 216
  Double Yellow, 205
Rockfoil, 415
Rock garden, the, 96
  plants for, 102
Rock Rose, 223
  Tobacco, 729
Rockwood Lily, 149
Rodgersia, 415
Rohdea, 814
Romanzoffia, 669
Romneya, 190
Root, the, 26
  cap, 27
  cuttings, 51
  division of, 60
Root, functions of, 27
  hairs, 27
  kinds of, 28
  pressure, 28
  pruning, 1031
Rosa, 382
  arvensis, 404
  berberifolia, 404
  Brunoni, 403
  Ecæ, 405
  Eglanteria, 402
  lutescens, 402
  Lyelli, 402
  pimpinellifolia, 404
  pisiformis, 403
  polyantha, 408
  rubrifolia, 401
  sulphurea, 402
Rosaceæ, 355
Roscoëa, 884
Rose, 382
  Alpine, 589
  Apple, 404
  Ayrshire, 398
  Banksian, 396
  Bay, 452, 584
  Bengal, 394
  Bourbon, 394
  Boursalt, 395
  Burnet, 404
  Button, 402
  Cabbage, 395, 401
  Campion, 255
  Carolina Swamp, 401
  Cherokee, 402
  China, 394, 402
  Christmas, 152
  Climbing, 400, 404
  Damask, 397, 401
  Dawson, 408
  Dog, 401
  Evergreen, 398
  French, 398
  Green, 402
  Hybrid Perpetual, 386
  Japanese, 404
  Lenten, 153
  Macartney, 401
  Monthly, 394
  Moss, 395
  Multiflora, 397, 403
  Musk, 403
  Noisette, 393
  of Heaven, 255
  of Sharon, 266
  Polyantha, 397
  Portland, 386
  Prairie, 404
  Provence, 395, 401
  Ramanas, 404
  Rock, 223
  Root, 440
  Scotch, 404
  Sweet Briar, 398
  Tea, 389
    Hybrid, 392
  Wild, 400
  York and Lancaster, 397, 398
Rosemary, 750
  Wild, 579
Roses, budding, 385
  diseases of, 385
  pegging down, 384
  propagation of, 384
  pruning, 384
  rust on, 386
Rosin Plant, 511
Rosmarinus, 750
Rotation of crops, 1104
Rowan-tree, 405
  Dog, 480
Royal Cowslip, 610
  Fern, 1022
Rubeæ, 871
Rubiaceæ, 486
Rubus, 871
Rudbeckia, 514
  angustifolia, 515
  Chrysomela, 514
  Newmanni, 515
Rue, Anemone, 188
  Common, 295
  Fen, 188
Rumex Hydrolapathum, 768
Runners, 31
Rupture Wort, 761
Ruscus, 810
  racemosus, 810
Rush, Flowering, 806
Rush Lily, 948
Rust on Roses, 386
Ruta, 295
Rutaceæ, 295

S

SAFFLOWER, 551
Saffron Thistle, 551
Sage, 746, 1164
  Jerusalem, 757
  of Bethlehem, 675
Sagina, 260
Sagittaria, 806
Salicineæ, 802
Salisburia adiantifolia, 987
Salix, 802
  acutifolia, 802
  pendula, 802
  villarsiana, 803
Sallow, 802
  Thorn, 781
Salmon Berry, 873
Salpiglossis, 700
  integrifolia, 697
Salsafy, 1145
Salt Tree, 841
Salvia, 746, 1164
  acuminata, 747
  colorans, 749
  colorata, 748
  macrantha, 748
  patula, 747
  Pitcheri, 747
  porphyrata, 749
  spectabilis, 746
Sambucus, 477
  californica, 478
Samolus, 682
Sand Myrtle, 584
  Plum, 868
  Verbena, 760
Sandwort, 259
Sanfoin, 846
Sanguinaria, 195
Sanicle, Bear's Ear, 624
Santolina, 529
Sanvitalia, 512
Sapindaceæ, 810
Saponaria, 249
Sarcocapnos, 200
Sarmienta, 729
Sarracenia, 189
Sarraceniaceæ, 188
Sassafras, 775
Satin Flower, 887, 948
Satureia, 1165
Saururus, 774
Savin, Common, 981
Savory, 1165
Savoy Cabbage, 1115
Saxegothæa, 986
Saxifraga, 415
  afghanica, 425
  biflora, 424
  ceratophylla, 426
  granatensis, 421
  intacta, 417
  Kochi, 424
  paradoxa, 425
  retusa, 424
  rudolphiana, 424
  speciosa, 426
  Wallacei, 419
Saxifrageæ, 414
Scabiosa, 491
Scabious, Purple, 491
  Sheep's, 557
  Sweet, 491
Scammony, 686
Scarboro' Lily, 918
Scarlet Runner Beans 1127
Schizandra, 176
Schizanthus, 699
Schizocodon, 600
Schizoneura lanigera, 1046
Schizopetalon, 213
Schizophragma, 481
Schizostylis, 948
Schouwia, 217
Sciadopitys, 989
Scilla, 838
  amæna sibirica, 840
  amœnula, 840
  campanulata, 840
  Clusi, 840
  hemisphærica, 840
  patula, 840
  pumila, 840
  uniflora, 840
Scions, 55
Scirpus, 972
Scitamineæ, 884

Scolopendrium, 1014
Scolymus, 552
Scopolia, 694
Scorpion Senna, 845
Scorzonera, 1145
Scots Fir, 995
Scrophularineæ, 701
Scutellaria, 758
Scyphanthus elegans, 459
Sea Buckthorn, 781
  Heath, 288
  Holly, 465
  Kale, 221, 1121
  Lavender, 601
  Pink, 608
  Weed Manure, 76
Securigera, 885
Sedge, 971
Sedum, 438
  albescens, 440
  altissimum, 440
  carneum variegatum, 440
  collinum, 440
  dentatum, 441
  denticulatum, 441
  elegans, 440
  Fabaria, 441
  formosum, 439
  involucratum, 440
  lividum, 439
  neglectum, 439
  selskyanum, 439
  spurium, 441
  virens, 440
Seed, 24
  covering, 48
  germination of, 25
  how to sow, 45
  leaves, 25
  soil for, 48
  sowing, 42, 45
  vitality of, 26
Seed-beds, 44
Seedlings, thinning, 46
  pricking out, 46
Selagineæ, 787
Selenia, 208
Self-heal, 754
Sempervivum, 441
  californicum, 442
  Comollei, 442
  cornutum, 441
  globiferum, 442
  italicum, 442
  piliferum, 442
  Requieni, 443
  Royeni, 442
  rusticanum, 442
  Seguieri, 442
  spinosum, 438
Senecio, 540
  uniflorus, 542
Senecionoideæ, 589
Senna Scorpion, 845
  Wild, 854
Sequoia, 984
Setter Wort, 162
Shallot, 1151
Shamrock Pea, 883
  Four-leaved, 884
Sheep Berry, 479
  Laurel, 583
Sheep's Scabious, 557
Shepherdia, 781
Shield Fern, 1018
  Alpine, 1018
  Prickly, 1018
Shoes and Stockings, 887
Shooting Stars, 625
Shortia, 600
Siberian Cherry Crab, 406
Sibthorpia, 721
Sida, 278
Sidalcea, 276
Sieversia paradoxa, 874
  triflora, 876
Silene, 250
  Cucubalus, 252
  paradoxa, 253
Silk Grass, 821
  Vine, 647
Silphium, 511
Silver Bell Tree, 684
  Berry, 780
  Fir, 1001
    Low's, 1003
  Grain, 80
  Leaf, 1071
  Tree, Missouri, 780
  Weed, 377
Silybum, 549
Simarubeæ, 298
Sinapis, 1164
Sisyrinchium, 948
Sitka Water Leaf, 669
Skimmia, 297
Skull Cap, 758
Skunk Cabbage, 955
Sleeping Disease, 1139
Slipper Flower, 708
Sloe, 859
Slugworms, 1048
Small Ermine Moth, 1048
Smilacina, 812
  bifolia, 813
  canadensis, 813
Smilax, 808
Smoke Plant, 319
Snake-root, 495, 768
  Black, 164
  Canadian, 772
  Seneca, 288
Snake's Beard, 889
Snake's Head, 859
Snapdragon, 710
Snowball-tree, 480
Snowberry-tree, 481
Snowdrop, 906
  Tree, 684
Snowflake, Spring, 988
  Summer, 908
Snow Wreath, 370
Soap Plant, 823
  Tree, 858
Soapwort, 249
Social Caterpillars, 1048
Soft Grass, 961
Sogalgina, 523
Soil, the, 61
  improving the, 68
  kinds of, 61
  liming the, 67, 1080
Solanaceæ, 687
Solanaceous Crops, 1138
Solanum, 687
  abyssinicum, 689
  Balbisi, 690
  Bird, 688
  Commersoni, 1138
  decurrens, 690
  etuberosum, 1138
  fragrans, 690
  laciniatum, 688
  Lycopersicum, 1137
  macranthum, 689
  Maglia, 1138
  niveum, 688
  racemiflorum, 1140
  sanguineum, 687
  tuberosum, 1138
Soldanella, 625
Solidago, 496
  altissima, 497
  fragrans, 497
Solomon's Seal, 811
  False, 812
Soot, 72
Sophora, 852
Sorbus americana, 405
  chamæmespilus, 406
  domestica, 407
Sorrel Tree, 577
  Wood, 292
Sour Gum, 477
Southernwood, 588
Sowbread, 626
Spadicifloræ, 128, 952
Spanish Chestnut, 800, 1100
  Iris, 935
  Oyster Plant, 553
Sparaxis, 946
  pulcherrima, 948
Sparganium, 958
Spartianthus junceus, 880
Spartium, 880
  ætnense, 828
  radiatum, 829
Spearmint, 1164
Spearwort, Greater, 149
Specularia, 569
Speedwell, 724
  Great Virginian, 727
  Hungarian, 727
  Rock, 727
Spergula pilifera, 260
Spermatozoids, 1009
Sphærotheca pannosa, 885, 1080
Sphenogyne speciosa, 544
Spider Orchis, 892
Spiderwort, 807
Spigelia, 649
Spignel, 468
Spinach, 1152
  Beet, 1152
  Mountain, 1153
  New Zealand, 1154
Spinacia oleracea, 1152
Spindle Tree, 801
Spines, 32
Spinovitis Davidi, 809
Spiræa, 868
  altaica, 867
  amurensis, 868
  Anthony Waterer, 867
  ariæfolia, 866
  barbata, 414
  Boursieri, 866
  Bumalda, 867
  callosa, 867
  capitata, 869
  ceanothifolia, 866
  chinensis, 868
  confusa, 867
  corymbosa, 866
  crispifolia, 866
  flagellata, 867
  Fortunei, 867
  grandiflora, 869
  incisa, 869
  japonica, 414
  kumaonensis, 866
  laxiflora, 868
  media rotundifolia, 866
  Menziesi, 866
  monogyna, 869
  multiflora alba, 865
  oblongifolia, 867
  opulifolia, 868
  reevesiana, 866
  rhamnifolia, 868
  trifoliata, 870
Spleenwort, 1014
  Black Maidenhair, 1014
  Forked, 1016
  Maidenhair, 1016
  Scaly, 1015
  Sea, 1016
  Smooth Rock, 1015
  Wall Rue, 1016
Spongiole, 27
Spraguea, 263
Spray Bush, 866
Sprekelia, 910
Spring Bell, 943
Spruce, American Blue, 998
  Black, 998
  Fig, 996
  Hemlock, 999
  Himalayan, 997
  Norway, 997